

BOOKS ON EDUCATION

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EDUCATION AND VOCATIONS

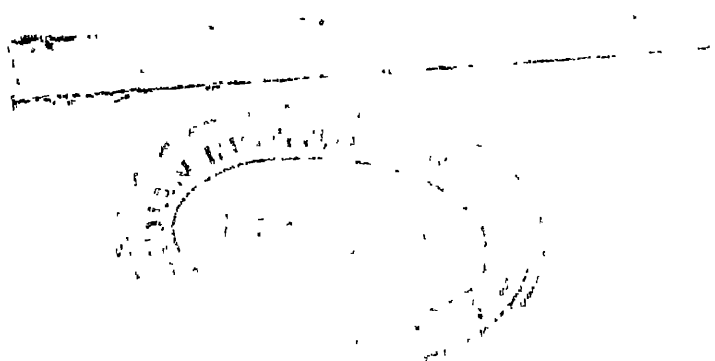
EDUCATION AND VOCATIONS:

PRINCIPLES AND PROBLEMS OF VOCATIONAL EDUCATION

BY

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PREFACE

This volume is devoted primarily to a discussion of present problems incident to education and vocations. It is designed especially for teachers and prospective teachers in vocational schools and departments of secondary grade; teachers and prospective teachers in professional schools and departments of college grade; directors, supervisors, and principals in vocational education; and administrative officers and students of the broader aspects of education. The discussions are intended to assist such persons in meeting the problems which arise in making the needed adjustment between education and vocations.

Problems of vocations are considered from the standpoint of the individual, of the group of individuals organized for a particular purpose, and of economic society as a whole. The problems of education are considered from the standpoint of the basic principles of psychology and the laws of learning, the principles of economics and sociology, and the principles and practices of sound school administration. Consideration is given to purpose, content, methods of teaching, and school organization, with a view of proposing a unified program of vocational education. Briefly stated, the major problems discussed are:

- (1) Why is vocational education necessary?
- (2) Why is there confusion and conflict of views regarding vocational education?
- (3) What are the major aims in vocational education and how have they been established?
- (4) What type of organization shall be set up to accomplish these aims?

- (5) How shall the content of instruction in vocational education be determined?
- (6) What methods shall we use in teaching?
- (7) What shall be the policy in the organization and administration of vocational education?

The plan of the book is derived from actual teaching experience in the development of a course in the theory of vocational education. It is urgently recommended that students give careful consideration to the preliminary questions and suggestions preceding each chapter. To do so will add much to interest and profit in reading the content. The summaries at the close of the chapters are both abstracts and abstract. Consequently, the use of these should follow the reading of the chapter. Otherwise they are likely to be unintelligible or misleading.

THE EDITORS

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THE AUTHOR

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EDUCATION AND VOCATIONS

CHAPTER I

INTRODUCTION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. What is a 'vocational' study or 'subject'?
2. A city high school offers the following: French, Dress Design, Physical Education and Hygiene, Mediæval History, Stenography and Typewriting, Biology, Printing, Mechanical Drawing, Trigonometry. Which of them are 'vocational'?
3. In a curriculum for high school teachers a teachers' college offers Principles of Teaching, Educational Psychology, Latin, Ancient History, Biology, Algebra. Which of them are 'vocational' subjects?
4. A pupil entered the arts college from the classical course in the high school. In college he specialized in Greek, Latin, and Semitic languages, as a basis for graduate work in archæological research. But at graduation he married and became a teacher of Latin in a city high school. Was his study of Latin in high school and college 'vocational'?
5. A boy in the Manual Training course in the high school makes a necktie rack. Is his work 'vocational'?
6. One girl learns to prepare and serve a meal under a competent teacher no part of whose salary is paid from the State funds for Vocational Education; another girl learns to prepare and serve a meal under an equally competent teacher one-half of whose salary is paid from the State funds appropriated for the support of Vocational Education. In which case is the series of lessons in meal preparation 'vocational'?
7. In the same town are located a college preparatory school and a state trade school. In both schools the boys read Stevenson's 'Treasure Island' and write compositions about it. In which case is the reading and composition 'vocational'?
8. The study of Machine Design in a trade school is 'vocational,' but the study of Machine Design in a college of Mechanical Engineering is not. If a state college of Agriculture offers a required course in Economics

the course is 'vocational' but a course in the Arts college, required of all students, is not. What do you say?

9. If a student studies Farm Management to discover whether or not farming appeals to him as a possible vocation the course is not 'vocational'; if he takes the course because he has made up his mind to be a farm owner and operator the course is 'vocational.' What do you say?

10. A boy lives in a Harlem flat and expects to become a bookkeeper in his uncle's store on 125th Street when he finishes high school. Is it "Prussian determinism" if the physical director of the school which he attends develops in him habits of vigorous outdoor exercise?

11. It is a pretty well established fact that the graduate of a medical college can more easily obtain a license to practice medicine than can a young man who has left school at the end of the sixth grade to do clerking in a hardware store. Of two insurance agents, one of whom holds the A.B. while the other does not, the first may become a member of the University Club, the second may not. Are medical colleges and arts colleges therefore undemocratic institutions, since they confer initial advantages in life upon their graduates?

12. Just why is it more "vital and democratic" to learn to lay bricks skillfully, and with pleasure in the skill, than to read poetry well and enjoy it?

CONFUSION AND CONFLICT OF VIEWS

1. It is a frequent habit of administrators and teachers to speak of 'vocational subjects' as contrasted with 'liberal or cultural studies.' Thus 'Animal Husbandry,' 'Household Management,' 'Mechanical Drawing,' 'Printing,' 'Strength of Materials,' and the 'Laws of Contract,' are vocational subjects: whereas French, Mediæval History, Inorganic Chemistry, Physiology, Economics, and 'Elizabethan Drama' are not.

Quite opposed to that view is another almost equally common. The purpose of a subject and not the subject itself determines whether it shall or shall not be regarded as 'vocational.' Thus Physics is a vocational study for the prospective engineer, Latin for the prospective teacher of Latin, and 'Floriculture' for the prospective florist. But Latin and 'Floriculture' are not vocational studies for the engineer-to-be, or Physics and 'Floriculture' for the Latin-teacher-to-be, or Latin and Physics for the prospective florist. This view is

sometimes extended to make result rather than purpose the criterion. If, by any chance, the student taught Physics, as an aid to his profession of engineer, becomes a florist, then Physics, retroactively, becomes in his 'preparation for life' a 'liberal study' and 'Floriculture' a 'vocational study.'

Not infrequent among school men is the opinion that not subject or purpose but the apparatus of instruction defines education as vocational. If, to learn a certain meaning, a boy must use a hammer and a saw, or a girl shears and a needle, that part of his or her education is 'vocational.' It involves the use of tools proper to certain trades and so must partake of the nature of economic production.

Because of legislative enactments and administrative classification by 'state boards' and municipal boards of education, the 'vocational' and the 'non-vocational' in schools, departments, and studies are set apart, even when in purpose and organization, or in content and method, a distinction is difficult to make. Thus departments of 'Homemaking,' 'Agriculture,' and 'Stenography and Typewriting' in high schools remain 'academic' or 'non-vocational' while supported from the usual school funds, but become 'vocational' if granted subsidy from state or federal funds appropriated for the promotion of 'vocational education.' To thousands of teachers and school administrators, a 'vocational course' is a "Smith-Hughes" course or a "state-aided" course.

Again there is the view that the institution in which a subject is offered makes it vocational or not so. Chemistry taught in the college of Agriculture is vocational, Chemistry taught in the college of Arts is not; English in the trade schools is vocational, in the high school it is not.

Many college professors revolt against the idea that Law, Medicine, Engineering, Architecture, Agriculture, in their respective schools at the university—even the courses in 'Education' in the school of 'Education'—are 'vocational courses.' At best they fall in the category of 'higher education,' at worst in that of 'professional education'; but they

are certainly not 'vocational.' 'Vocational education' is found in prisons, reformatories, asylums, and in trade schools, commercial schools, and the apprentice schools of industry; unfortunately, too, it is found with increasing frequency in public high schools; but the university is free from the taint of it.

Another opinion, widely held, sets apart 'prevocational education' from 'vocational education.' Education designed to enable the individual to discover the vocation that he may most hopefully follow belongs to the 'prevocational' field or to 'vocational guidance.' Only that education which prepares the individual for the pursuit of a 'gainful occupation,' whether chosen or not, is 'vocational education.'

So much to illustrate a lack of common understanding of what vocational education is. The same lack is shown in conflict of opinion as to the worth and human significance of vocational education.

Among laymen, two brilliant essayists have expressed diametrically opposite judgments. One finds 'vocational education' "preëminently selfish"; the other defines it as "education in service and for service" to mankind.

The president of a university famous for the success of its professional schools, — which, by the way, he carefully excludes from the 'vocational' category, — condemns 'vocational education' as "thoroughly undemocratic," because it is "deterministic and Prussian," fixing for youth the mode of life which he must follow, willy-nilly. Another president, who does not exempt the professional schools, agrees that vocational education is "undemocratic," on the ground that it gives to the privileged individual "an initial advantage in the economic struggle." But a third disagrees in the statement that vocational education is the "only real, vital, and democratic education" with which our democracy is blessed.

In aim, in organization, and in method, the agencies of 'vocational education,' even in the same class, such as law schools, or medical schools, or engineering colleges, or teachers'

colleges, or schools of agriculture, or schools of domestic economy, and so on, reflect differences in conception of the nature and purpose of what is called 'vocational education.' A foreign visitor who had spent many months in visiting such schools in the United States remarked: "What is the principle of your vocational education? I am quite at sea. I have discovered no common philosophy."

2. A school or other educative agency is created and maintained for the purpose of meeting certain social needs, whether of large groups or of small. In theory the needs are discovered by the group, which then designates 'experts' to whom it delegates the responsibility of organizing the school or agency appropriately to the meeting of those needs. Who shall be taught and to what end they shall be taught, it is, in theory, the function of the 'lay group' to say. In the case of the school this is the function of the 'board of education' or the 'board of trustees' representing the group whose needs are to be met. On the other hand, what is to be taught, how it is to be taught, under what conditions, and how long, it is the function of the designated expert, usually called an 'educator,' to determine. In practice, however, the lay group seldom restricts its function to the determination of the needs and the designation of the expert. It prescribes the amount of schooling, the content of curricula, the number and qualifications of staff personnel — even the mode of teaching. That is, it usurps many of the functions which, in theory, belong to the expert. Nor does it always seek the expert or trust him when it has found him. In practice, the least qualification of the designated 'expert' in education may be knowledge of education. If he has it he may be allowed only in small measure to use it.

Nevertheless, the designated 'educator,' be his authority great or small, does, if he is honest, as most of them are, organize his own activities and direct the activities of those under his authority in accordance with his conception of the nature and purpose of education. Thus we find such cases as these among sincere and earnest 'educators': (a) The director of a 'com-

munity vocational school' regards the main function of his school as the preparation of boys and girls to enter college. He is quite successful in achieving that end. (b) The dean of an engineering college declares that he is not at all interested in the education of engineers, but only in the "education of men." In the opinion of certain practicing engineers, he has been quite successful in not educating engineers. (c) The principal of a 'State Trade School' designs to provide the Mills with 'skilled help.' In the judgment of the mill operators, he is very successful.

Within the organization of a school, teachers have, as they ought to have, some freedom in the choice of what they teach and how they teach it. The sincere teacher teaches what he believes is desirable, in the way that he believes is desirable. We find such cases as these: (a) A teacher of 'Animal Husbandry' in a school which was organized, as its announcements and its printed curricula indicated clearly, to prepare boys for 'efficiency in productive agriculture,' had a list of the bones in the skeleton of a horse, more than two hundred in number, which his pupils must memorize and 'place' on a picture of a skeleton in the laboratory. His argument was: "They all will use horses. The horse is a machine for work. The man who uses a machine ought to know how it is put together and the names of the parts. Of course they won't remember all the names, but the exercise is good memory training anyway." (b) A teacher of 'House Carpentry' in a trade school said: "These boys are going to be carpenters. They are going to be good carpenters and proud of it, if I can make them so. I have them do every job, so far as I can, that a carpenter has to do. They have to plan each job in detail and to show me why they planned it as they did. Then they have to do it, and do it right. When it is approved it is a job no carpenter need be ashamed of." (c) A teacher of 'Educational Psychology' in a course for prospective teachers of 'Homemaking' gave several lectures on the nature and influence of dreams, because "that is part of psychology and something that everybody ought to know."

What educative agencies we shall have, then, under the name of 'vocational education,' who may attend them, who shall teach, what shall be taught, by what methods and under what conditions it shall be taught, are determined by the conceptions of purposes, functions, and essential characteristics of 'vocational education' held by administrators, teachers, school boards, lay leaders, and finally by the lay public. So long as those conceptions are vague, diverse, and conflicting there will remain marked inequalities in opportunities for 'vocational education.' So long as 'educators' argue from totally different premises the issues will remain befogged. The public will remain to some extent justified in its failure to select 'experts' by any discoverable criterion of expertness, and in its custom of not trusting very far those whom it selects.

The purpose of this volume is to assist in defining the bases and clarifying the theory of vocational education. For, in the belief of the author at least, there is a system of principles and problems in the relation of education and vocations which deserves the name of theory, and which may serve usefully in the improvement of practice, the satisfaction of practitioners, and the enlargement of opportunities for service and happiness in our democracy.

SUMMARY ABSTRACT

1. Vocational education is a kind of education. That is agreed upon. But as to what education is vocational and what the significance of vocational education may be, there is much confusion and conflict of opinion. For example, 'subjects' in schools and colleges are variously classed as 'vocational' or not so, according to:

- a. Their intrinsic nature.
- b. The purpose of teaching.
- c. The ultimate use made of them by those who have studied them.
- d. The materials and processes used in learning
- e. The administrative or legal category into which they fall.
- f. The name or character of the institution in which they are offered.
- g. The level or grade of the educational institution in which they are offered.

Again, a school, course, subject, or other educative undertaking is classed as vocational education when it is organized to prepare pupils for economic efficiency in production, but not when it is organized to enable selection of an appropriate vocation by pupils. Finally, vocational education is both condemned as deterministic and praised as the most democratic of all forms of education.

2. The lack of common understanding of the meaning and significance of vocational education which these divergent and conflicting views reveal is a matter of great social importance. What we shall have in the way of support for various forms of education is largely determined by the sanction of laymen; what the forms shall be is largely a matter of the educational philosophy of educators. There can be no sound policy of development or repression of agencies of vocational education, and no consistent functioning of established agencies in the absence of common bases in understanding of the purpose and nature of vocational education.

CHAPTER II

VOCATION FROM THE INDIVIDUAL STANDPOINT

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. What was the vocation of Robinson Crusoe during the period of his solitude?

2. If a man shave himself skillfully three hundred and sixty-five times a year, thereby saving \$73 a year, is he an economic producer? When engaged in shaving is he following a vocation?

3. For each of the following consider questions *a* and *b*:

a. What does he or she produce?

b. In producing that product is he or she engaged in a vocation?

Diamond polisher.

Actress.

Stevedore.

Teacher.

Retailer of ice.

Policeman.

Dairy farmer.

Advertising agent.

Plumber.

Burglar.

4. How does a shoe repairer produce? A printer? A surgeon? A lawyer?

5. Is a banker, pondering the problem of a bond purchase, engaged in a vocation?

6. If a man become a dentist, what is implied, with respect to his shoes, his hat, his house, his meals, the dentist's chair he uses?

7. If five thousand men in a city specialize in police work, what specializations are implied for other men of the city?

8. Why does a teacher require an income? What is an income?

9. A prisoner in the road gang breaks rock and receives fifty cents a day and keep. Is he an economic producer? Do you think it proper to say that he is following a vocation?

10. A Vermont dairy farmer earns for twenty years an average 'labor income' of \$300 per year. He refuses to sell his farm to a hotel company for \$60,000. A Washington fruit grower earns for ten years an average 'labor income' of \$7500 per year. At the end of that time he rents his farm for \$2500 per year and retires in good health to Pasadena 'to live.' In what sense has each man succeeded in his vocation? Failed?

PURSUIT AND CALLING

1. To be *economic*, productive activities must result in *exchangeable utilities* — commodities or services which meet a want in other persons than the producer, and for which they give an accepted equivalent. Not all productive activities are economic. A tramp may cut a switch from beside the road to threaten a barking dog or he may sharpen a sliver to pick his teeth. In either case he has *produced* a useful thing — a weapon or a toothpick — for his own use. Or, he may stop by the brook before reaching town to wash his face and ‘slick down’ his hair. Again he has produced — has performed a service for himself. But he has not produced commodity or service for exchange. The woodchuck pulls grass and carries it into his burrow for a nest, and ‘washes his face’ by licking his paws and rubbing them over it. His activities, like those of the tramp, are productive and useful, but they are not economic. Economic production implies social membership and doing something of use to others.

Producing, in the case of commodities, is *adding* to material things *attributes of availability* which the economist calls *values*. The full value of production is realized when the commodity, in the form and quantity desired, is placed at the disposal of the consumer where and when he wants it. The baker gives to flour, salt, yeast, butter, milk, and water a new form whereby they become in combination consumable as they were not before he ‘made’ the bread. The butcher, cutting the carcass of a lamb into quarters, shoulders, chops, and so on, gives to the flesh forms appropriate to the particular wants of his customers. Both have produced commodities, which, as such, did not exist before, by adding *form values* to material things. Now if the delivery wagon takes the bread from the bakery to the grocery store or delicatessen shop a new value is added — *a place value* — since the bread is now accessible more readily to those who want it than before. If the butcher ‘bones’ a roast of lamb for a customer, and then delivers it at the cus-

tomers' back door a mile away at 11 o'clock as requested, he has added to the flesh of lamb not only form and place values but *time value* also. He has produced not a 'boned roast' of lamb merely, but a 'boned roast' ready at the kitchen door just when the housewife wants it to put in the oven. The roast is worth more to her than it was in his shop at 9 o'clock or than it would be at the kitchen door at 2 o'clock. Some men produce chiefly by changing the form of things, as the heel cutter, the foundryman, the machinist, and other manufacturing operatives; others, chiefly by adding place and time values, as the freight handler, the truckman, the warehouseman, and most of the workers in transportation, storage and delivery. But, since all values must be added in time and space, few economic producers confine their producing to one value only. The farmer who feeds cattle and milks them changes the form of materials, the place of materials, and the time at which materials are available. Even the druggist who wraps and hands to you a tube of vaseline across his counter has changed its availability for your use in form, in place, and in time.

Preachers, lawyers, teachers, editors, lecturers, policemen, are producers. They do very little in the way of changing the form of material goods, the place of material goods, or the time at which the goods are available. They render services, and in the case of services the several kinds of value are not readily discernible. But the essence of good service on the part of anyone, from a side show 'barker' to a justice of the Supreme Court of the United States, is to *perform the appropriate action where it is wanted and when it is wanted*. Even 'the producer' of a play must cast and stage it properly, offer it in a theatre which is accessible, and at a season and time of day when playgoers can attend — i.e., give it form, time, and place value, though it is not a material thing.

Added value is the product of the productive process. The process itself is ultimately *moving things into new relationships*. The properties of things moved then determine the product. In the case of commodities the fact is clear enough. The baker

moves together in appropriate quantities, determined by movement, the ingredients of bread. All his mixing, kneading, rolling, fitting, placing in pans and oven, and so on, are essentially moving things into new relationships. The properties of flour, salt, yeast, butter, milk, and water in relation to one another and to steel pans and hot ovens are quite as significant to the product as are the various movings. Let the baker substitute fine loam for the flour and repeat the same movements throughout. The product will not be bread. So, too, the butcher moves the carcass of lamb into new relations with the cutting block, and the saw, cleaver, and knife into new relations with the carcass. Let him substitute a tub of water for the block and a lath for the knife and attempt the same movements. The result will not be 'boned roast.' Such movings, or physical action, John Stuart Mill calls labor. *The essentials of production*, he says, *are labor and appropriate material objects* — that is, action and something to act upon.

With services, labor as the essence of production is not so obvious. Nevertheless, no service can be performed unless there be movement and something moved. Pupils may learn, but they are not taught unless the teacher does something other than to think or dream. No sermon is preached till the preacher speaks; no editorial may be read till it is written. Nevertheless, though he recognizes that labor is the ultimate human factor in production, the economist, — outside of Russia at least, — is commonly not content to regard it as the sole human factor. He credits to other activities a part in production. The architect and the factory superintendent do relatively little by actual physical movement to add values to commodities or in immediate service to the consumer. But the drawings of the architect and the orders of the superintendent determine the effective labor of others. The drawings and the orders, however, are determined by processes of thought, and these unquestionably condition labor. In the same way the mental plannings of the carpenter installing a staircase determine what materials he will deal with, what tools he will

use and how he will use them, that is, his movements or productive labor. The cogitations of the judge in prolonged consideration of a case determine the few words that he may speak or the few strokes of a pen that he may make in the final rendering of his service of decision. *Thinking and judging*, planning and management, *do add*, indirectly though it be, *values to commodities and services*, and accordingly may be classed as *productive activities*. A man who sits quiet in a chair for five hours may be as genuinely engaged in economic production as the man who lays bricks continuously and perspiringly for the same time. Vocation is not a matter of bodily activity only.

In order that there may be exchange, that is, that production may be economic, the activity vocational — *the individual must produce more than he consumes of a particular utility*. The baker, to be a baker, must bake more bread than is necessary to satisfy his own cravings for the staff of life. The butcher, to be a butcher, must cut more beef, lamb and pork than he needs for his own use. The dairy farmer, to be a dairy farmer, must produce more milk than he drinks. Again the fact is clear in the case of commodities, but not so obvious with services. After all, however, the distinction between commodities and services, as that between mental and bodily activity, is a matter of convenience rather than of necessity. The baking of the baker, the cutting of the butcher, the feeding, milking, silo filling, plowing, etc., of the dairy farmer, — these are all services of the producer to the consumer which are mediate through bread, roasts, and milk. More directly, the barber uses the razor much more often than the growth of his own beard demands; the waiter places and removes far more dishes than his own table needs demand; the lawyer raises and settles in a year more difficulties with the law than would arise in his own civic relationships in a lifetime; the physician prescribes more medicine in a week than he and his family will need in ten years; the sleeping-car porter brushes frequently enough on a single trip to wear the nap off his own

best coat; and so on. Even the concert singer, no matter what his love of song, does not consume the song in the singing. It is available for the satisfaction of others.

An economic pursuit, then, involves, with reference to the producer's particular need for the thing he produces, a *surplus of some utility*. But this means, clearly enough, *specialization* in certain activities at the expense of others in which he might otherwise engage. The baker, because he is a baker, the lawyer, because he is a lawyer, must each forego, in part at least, house building, clothes making, butchering, producing milk, truck driving, prize fighting, making up prescriptions, making shoes, and so on. The more an individual does for others the less can he do for himself. In producing a *surplus* for others he leaves a *deficit* for himself.

In consequence he becomes *dependent* upon others for the satisfaction of certain of his wants. He tends to create a market, or the opportunity and necessity that others also specialize — and specialize in an economic activity different from his. If a thousand men by specializing in medicine or bricklaying become dependent upon others for shoes, clothes, meat, milk, and books, then there is opportunity and need for others to specialize in shoemaking, clothing manufacture, dairying, butchering, and publishing. The existence of an economic pursuit for one man is both a cause and a consequence of the existence of different pursuits by other men. *Specialization* in service for others means *diversity of production* by others, and a *mutual interdependence* among producers.

Out of this state of affairs grows the necessity for *income* for the producer — for every economic producer. Income is usually measured in money, but it is not money. It is command by the individual over the surplus products of others, whether through custom, law, barter, or money. It is a condition and a reward of service to others in an economic pursuit: a condition in that it enables the producer to spare the time and energy necessary to his specialization; a reward in that it may bring to him satisfactions over and above those of 'the joy of work.'

Because of income the individual is freed and may be moved to serve others; because of income he may cause and enable others to serve him.

In its aspect as an *economic pursuit*, then, *vocation consists in specialized activities productive of utilities exchangeable for utilities produced by others.*

2. So far we have considered vocation from the point of view of what the individual does as a servant of his fellows; we have looked at vocation from the outside. What a man or woman is and feels in the activities of economic production is, however, quite as significant humanly, as what he or she accomplishes through those activities. The inside is as real as the outside. And that fact is recognized in older usage, at least. From the date of its origin in the Latin verb *vocare* — to call or summon — until very recently, the word vocation has been used with emphasis upon the inner aspect. It meant a *calling*, “an inner urge,” a central and moving interest in life, a summons of the spirit. A man’s calling or vocation was found in those activities which were to him most satisfying and worth while in themselves. They might be or might not be activities of economic service.

The world is full of men and women who follow one pursuit and another calling, who have missed their vocations in the full sense of the word. They produce in a manner sufficiently satisfactory to be tolerated by their fellows; they hold a job and make a living; but find little satisfaction in their producing. Their interest lies elsewhere. Everyone is familiar with the teacher who survives the nine months of the school year to live in vacation; with the business man who tolerates his office routine because he must, but finds his happiness on the golf links; with the farmer or engineer in the new lands who labors impatiently to ‘make his pile’ in order that as soon as may be possible he may retire to ‘God’s Country’ to live; in short, with the individual to whom work is merely work and a necessary evil, a means to an end only, and in no sense an end in itself.

The distinction between work and play emphasizes the subjective side of activity. If a man works in a sense not comparable with the working of a machine or of cider in a barrel, it is purpose and not product that determines the fact. The essence of play is that the motive to activity be found in the activity itself. Work approaches its maximum in the man who endures his job for the sake of the consequences, who works for what he 'can get out of it'; play approaches its maximum in the man who does his job for the 'very fun of it,' who works for what he 'finds in it.'

There are many of the latter sort, too. First are those rare cases of musical or artistic genius wherein the individual has found from the start that which he most enjoys his means to productive service and income. Of course, such cases are more numerous at lower levels of capacity and in humbler occupations. Still more numerous, perhaps, are those in whom habituation has come to the rescue, so that what was at first mere work has become at last play, and the most satisfying part of life. The case of the farmer, the artisan, the teacher, to whom retirement is the death of happiness, is not always fiction. There are thousands in whom the production of economic service has no other motive than the 'joy of work.' They may be 'slaves of habit' but habit, not the income which it earns, brings them joy.

3. Success in vocation for the individual approaches completeness in the degree that the activities through which he produces *goods* for others are those which he finds most satisfying. Service for others and happiness in that service for himself are the twin factors of success in vocation.

The full realization of success in vocation as thus defined is, of course, very rare. Assuming, however, that the significance of the individual as a member of society is in his serviceability to others, and that his significance to himself is conditioned by the realization of happiness, it is possible to set up as an ideal of vocational success the perfect reconciliation of efficiency in productive economic service with happiness in that service,

and to work toward the realization of that ideal for an increasingly larger proportion of human beings. That the ideal can be realized for all in any immediate prospect of society is unlikely. Those who deny that man has any obligation to service and any right to happiness will reject the ideal. But many, who believe in democracy and the worth of man, will accept it and work for its realization.

SUMMARY ABSTRACT

1. For the individual, vocation is an *economic pursuit*, i.e., his major activities in the production of exchangeable goods for the use of others.

- a. Economic goods are either material commodities or services that are exchangeable. Not all production is economic.
- b. In effect, producing is the addition of attributes of availability to materials or processes so that they become more readily consumable than before the act of producing.
- c. In process, producing is ultimately physical movement — action upon something. But the determination of that action is mental, so that activities of mind may be activities of producing.
- d. Production in the economic sense implies that the producer shall not be the sole consumer of his product.
- e. Production of goods of one sort or another in excess of his own consumption of them implies on the part of the producer specialization in producing activities, and a consequent deficit in respect to his needs for other goods than those of which he produces a surplus.
- f. If an individual or a group specialize in the production of goods of one sort, then another individual or group must specialize in production of goods of another sort. This implies division of labor, or diversity in specialization, and the mutual dependence of group on group and individual on individual.
- g. Accordingly, the economic producer must possess a certain command over goods produced by others than himself, i.e., an income.

2. For the individual, vocation is a *calling* or major interest in life

- a. The inner or subjective aspect is primary in the development of the meaning of the word vocation.
- b. As a calling, vocation may be an end in itself and not a means merely to economic service.

3. *Success in vocation* is the full reconciliation in the same individual of pursuit and calling.

- a. Success in such a sense is rare. Relative success is not so rare. The ideal of success through complete self-realization in full economic efficiency is worth striving for.

CHAPTER III

EDUCATION FROM THE INDIVIDUAL STANDPOINT

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. An Italian peasant boy of eighteen comes to this country and finds employment as washer of cars in a New York City garage. In six years' time he has become foreman of the repair shop in the garage. Setting aside any increase in weight, height, thickness of beard, etc., in what respects is he quite certainly different from the boy who washed cars? What would you call these differences? How were they brought about? What would you call the process by which they were brought about?

2. If the youth above swears in good old-fashioned English how did he come by the habit? Was he educated to it?

3. If the youth above reads and interprets correctly Wright's analysis of the job of adjusting a carburetor, how did he come by the ability? Was he educated to it?

4. Why is it that a farm-reared youth who spends four years at an agricultural college and graduates from the 'teacher training course' may be certificated as teacher of agriculture, whereas a man of equal intelligence who has worked ten seasons on a farm and taught the district school during winters may not?

5. Is all that a man has in the way of skill, technology, and insight which is of value in his vocation properly to be called his vocational education? Are all the processes by which he became possessed of such skill, knowledge, and insight properly to be called his vocational education?

6. What is vocational education from the standpoint of the individual?

EDUCATION AND THE INDIVIDUAL

1. Nobody has successfully defined mind. But the assumption of psychologists is that mind is an active process manifest in muscular or glandular action, and conditioned by the structure and state of the nervous system, and that it is also awareness or consciousness of what we call feelings and knowings, which also, if not absolutely governed, are certainly conditioned

by the structure and state of the nervous system. These manifestations of mind are called by psychologists the *behavior* of man.

By merely falling off a dock into the lake a man manifests no more mind than a log of wood pushed off the same dock. But by feeling cold and frightened, by being aware that he is over his depth and that his insurance premium is overdue, by kicking and thrashing with his arms and shouting for help, he does manifest mind, as the log or the stone or the watermelon, falling with like speed and a like splash, does not.

Now, the splash he makes will be no different whether he is falling in for the first time or for the hundredth time. But the feeling he will have, the thoughts he will have, the sounds he will utter, and the motions he will make will quite certainly be different the hundredth time from the first. That is, his manifestations of mind, his behavior, under practically identical circumstances, are quite changed. He is, in respect to mind, at least, a different man from the man who fell in the first time. By virtue of his many experiences in falling off a dock he has learned, we say, what to do. His behavior is modified.

It is not uncommon among writers upon education, particularly among psychologists, to treat the terms *learning* and *education* as virtually synonymous. This is a defensible, but not a useful practice. The use of the two terms as practical symbols for the same meaning is confusing. If they are identical in meaning, then one or the other term should be discarded in the interest of clearness. But in the common sense they are not identical. The layman recognizes that men learn many things without intent on their own part or that of anyone else that they shall learn; he recognizes that a part of what they learn is a product of someone's more or less definite provision that they shall learn certain things. That part of learning he calls *education*. That point of view is adopted here, all education being considered learning, but not all learning education, just as all horses are quadrupeds, but not all quadrupeds are horses.

Learning is the process by which man acquires tendencies to behavior with which he was not born. It is also the tendencies to behavior which he acquires by that process. These tendencies are indicated by such terms as knowledge, skills, ideals, attitudes, points of view, habits of mind, habits of conduct, etc. Now education is that part of the process of learning which is directed to ends of acquiring knowledge, skill, ideals, attitudes, etc., and the product in learning of such directed process. In other words, when an individual studies to learn, in school or elsewhere, that is a process of education, and the results are a product in education.

A boy brought up in a South Carolina home among negro servants talks with the soft and slurring manner of the South. Another boy brought up in Maine among Yankee farmers talks with the twang of the 'down-easter.' Neither boy sought to acquire his mode of speech, nor did anyone direct his activities or arrange an environment to cause him to acquire that particular mode. So, too, a boy in the school yard acquires certain 'swear words' and a good deal of slang. But he did not go into the school yard seeking to add to his vocabulary; nobody sent him into the yard where 'cuss words' and slang are found to give him an opportunity to learn them; and nobody provided, with a view to his possible benefit, an environment of 'swear words' and slang. Now, according to the view expressed above, the acquiring and acquirement of a Southern drawl, a Yankee twang, and fluency in mild profanity and slang, are parts of the boys' *learning*, but not of their *education*.

2. On the other hand, a boy collects insects, reads books, bulletins, and the *Nature Magazine* to learn their names, classification, and habitat; spends hours in watching caterpillars feed and change their skins or the moth emerging from the pupa and clearing its wings, etc., so as to learn habits and life history; visits a collector to learn how mounting is done by an expert; and so on. Again, he is by law and his parents compelled to attend first-year high school, where he is taught Algebra — which he dislikes — in order that he may learn to

understand and solve certain types of mathematical problems. Again, for the following summer his father 'gets him a job' in a grocery store, arranging with the employer that he be given opportunity at clerking, taking inventory, keeping accounts, grading stock, delivering goods, collecting bills, etc., in such a way that he may 'learn the business.' The boy rather likes to earn some money, finds clerking and delivering interesting, bookkeeping rather tedious, and collecting bills disagreeable, but has no idea that he is to 'learn the business' or any particular desire to do so. This boy, then, has a liking for mathematics and some knowledge and skill in it; a dislike for algebra but some knowledge and skill in it; and an indifferent attitude towards the grocery business, and some knowledge and skill in it. In the first case he directed his own learning; in the second a teacher directed his learning; in the third another person, his father, arranged an environment with a view to what he should learn. In all cases there was a *process* and a *product of learning*. But in these cases, according to the view we have taken, the *process* and the *product* are *education*.

As Professor Adams¹ puts it, education implies two agents, an *educand* or person to be educated, and an *educator*. The *educator* may be the *educand* himself, as was the boy studying insects; he may be a teacher, as in the case of the Algebra; or he may be another who acts less directly, as the father in the case of learning the grocery business. The *educand* is a person who ought to learn, that is, to become different in some manner of behavior from what he now is, and who is capable of learning. The *educator* is a person who desires that the *educand* become different and provides that he may so act as to become so, i.e., that he may learn. Directly or indirectly, but of educative purpose, the *educator*, whether he be the student himself, the parent, or the school administrator, *directs the learning* of the *educand* for the sake of what he is to learn.

The layman talks about learning through 'experience' and learning through 'education' as different things. The first

¹ Adams — Evolution of Educational Theory.

man in the machine shop or the farmer is likely to say that most of what he knows of his job he learned by experience and very little of it by education. That is, roughly, the very division we have been making. Learning in any man is 'education' plus 'experience' or 'experience' plus 'education,' using the latter two terms in the limited sense. The writer on educational theory, if he is not a psychologist, usually recognizes the same distinction by classifying his comprehensive 'education' into two parts, *informal education* or incidental learning, and *formal education* or directed learning. Our definition of education corresponds to the latter classification.

The important product of a millinery shop is hats. By-products of employment in that shop for a girl may be an attitude favorable to making hats, a knowledge of standards of taste and construction in hats, skill in finishing hats, and so on. In a millinery school the most important product is *girls who can make hats and enjoy making them*. The hats are a mere by-product. The first is an economic institution and most of the learning that is acquired in it is incidental; the second is an educational institution and most of the learning acquired in it is education.

Now whatever a man knows, feels, or does that makes him efficient as a producer of utilities for others and happy in his producing is due to modification of his native instincts and capacities — or to the learning process. Part of what contributes to his vocational efficiency and happiness has been learned incidentally to seeking ends other than learning, as a lawyer may have learned in playing ball certain habits of dealing with others and certain knowledge of the interests, needs, and habits of men and boys which make for efficiency in legal practice and satisfaction in the job. Again, part of his useful possessions in the pursuit and enjoyment of his vocation may be products of education which had no reference to the vocation of lawyer, as when he learned in school to read and write the English language, not because he, as a lawyer, would have need of reading and writing, but because, lawyer or not, in

youth and in maturity he has probable need of those abilities. Finally, a part of his possessions as lawyer has come from his study of torts, equity, contract, court procedure, and so on, in the law school or as apprentice to a practicing lawyer.

Now, one part of all his learning may be as valuable to the lawyer as another. His knowledge of men, learned in recreation and without purpose, may be as much an asset as his knowledge of court procedure, learned by purposeful and painstaking study. What he has, and not how he came by it, counts. Education is not necessarily more valuable in vocation than incidental learning, nor education directed to ends of vocational efficiency and satisfaction more valuable than education for other ends. In the product, one may be quite as significant as the other to the lawyer, the physician, the merchant, the farmer, the engineer, the nurse, the teacher, the housekeeper, the plumber, the stenographer, or the garage mechanic.

But *in process, education is more economical than incidental learning.* It insures that a man shall learn what by chance he might never learn. It insures that he shall learn in less time and in more compact compass than he is likely to do by incidental and accidental experience, through months or years and scatteringly. It should insure that his mode of learning will be direct and not wasteful. In short, education is more economical than incidental learning because it is *selective as to what shall be learned, when it shall be learned, where it shall be learned, and how it shall be learned.* It has been well said that "education is a short-cut" to valuable products of life experience.

3. So far as efficiency and happiness in vocation are concerned, that part of the *educative process which directs the activities and controls the environment of the learner to the end that he may acquire the mental attributes and abilities which make him an efficient and happy economic producer,* is more economical than education for other ends, which may yield by-products of value in vocation. Looking at education as individual and

as a process, then, we may call this part of education *vocational education*.

What a man possesses in the way of learning that makes him efficient and satisfyingly interested in his vocation furnishes a guide to the purposeful student, the teacher, and the administrator—in short, to the educator. It shows the *product for which he should design the process of vocational education*. It is a large factor in the determination of purposes or aims in vocational education, *and the chief factor in testing results* in vocational education. The *educator* deals directly only with the process, but conditions his dealings with it by the ends he has in view and the results he may attain. Hence, though his immediate problem lies mainly with the process of vocational education, he should never lose sight of the fact that understanding of vocational education as a product is a condition before and after the act of educating.

SUMMARY ABSTRACT

1. As a man changes in the way he thinks, acts, and feels, he learns. Learning may be regarded both as the process through which changes in mental traits are accomplished, and as the results of that process in attitudes, knowledges, and skills other than those he might have possessed without that process. Or, learning is both an activity and a product—how a man learns and what he learns.

2. Not all learning is education, in the common sense of the word. A man learns, for example, to do and to appreciate his work, both by experience in which no purpose to learn has a part, and by activity undertaken for the sake of acquiring learning, i.e., by education. Learning that is education may be directed by the learner or student himself, or by another, with or without purpose to learn on the part of the learner. Because it is directed toward a product in learning, education is, as mere experience is not, selective both as to what shall be learned and how it shall be learned. Hence education is, as compared with mere experience, an economical means of learning.

3. Vocational education—from the standpoint of the individual—is that part of education which is directed to the acquirement of skills, knowledges, and attitudes that make for efficiency in an economic pursuit and the realization of a calling in that pursuit. It is, of course, also the result of such a process.

CHAPTER IV

VOCATION FROM THE SOCIAL STANDPOINT

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Suppose a healthy 'gentleman of leisure' from Boston takes up his residence in Belize, British Honduras. Mention certain activities in which he will engage that would not occupy his time in Boston; certain activities in which he would probably engage in Boston and which he will quite certainly forego in Honduras. What determines the difference?

2. Mention certain activities in which a man will engage if he becomes a school superintendent and in which he will not engage if he becomes a plumber; certain activities in which a man will not engage if he becomes a postman and in which he would engage if he were a surgeon. What determines the difference?

3. This is a free country. How far are you now free to elect and enter each of the following vocations Heavy-weight prize-fighter? Kindergarten teacher? Cartoonist? Moving-picture actress? Boatswain in the United States Navy? Professor of the History of Philosophy? Insurance agent? Housemaid?

4. What can you say with a fair degree of certainty concerning the sex, age, race, physique, and minimal levels of capacity to deal with people, capacity to deal with tools, implements, and mechanisms, and capacity to deal with ideas, that characterize a majority of the membership in the following vocations:

Fruit vender?

Pawnbroker?

Alderman?

Teacher of Home Economics?

Admiral?

Ballet dancer?

Hotel manager?

Stenographer?

Railroad president?

Steam fitter?

5. What factor probably leads college women in general to prefer teaching in schools to teaching in homes as governesses? Why do so many college graduates among men aspire to be brokers and bond salesmen or authors rather than contractors, retail merchants, and farmers?

6. Would you advise your boy, if he seemed interested, to prepare himself to be a coachman? A wheelwright? A wood engraver?

7. Why can we not prepare an engineer, a physician, or a chemist

once and for all to meet the demands of his profession? Can we really give him any preparation at all?

8. Many parents are averse to having their children become aviators, employees in chemical industries, or actors. Why?

9. Why cannot every boy in Kentucky who is capable of it become a tobacco grower? A professor of Greek? A shoe manufacturer?

10. Bolt setting and general law practice represent extremes in vocations. How? Nearer which extreme would you place each of the following: Bookkeeping? Newspaper editing? Corn and hog farming? Stenography? Dentistry? Teaching Economics in a college? Running a locomotive? Producing plays? Budding peach trees? Picking poultry?

11. What appear to you to be the essential differences between trade and profession? Is specialization in extraction of teeth a trade or a profession? Does a professional pianist follow a profession? How would you class the vocation of the prescription clerk? Of the owner druggist? Of the floor walker? Of the automobile salesman? Of the garage mechanic? Of the bookkeeper in a bank? Of a traffic policeman? Of a minstrel end man in a vaudeville show?

12. Which of these vocations are 'free and independent'? Bank president? Dairy farmer? Physician? Type-setter? School-teacher? Waiter?

SOME CHARACTERISTICS OF VOCATIONS

1. So far we have considered vocation only in its aspects of outer and inner activity in economic production by the individual and of inner satisfaction for the individual. But vocation must also be considered from the social standpoint, for vocations are social institutions, which in their inter-adjustments and coordinations make up, first, industries, and finally, the structure and organization of economic society.

Recognition of the fact that vocations are institutions is evident in such common-speech statements as these:

Moe Levinski has entered the retail clothing business.

Joe Mosher has gone into dairy farming.

William Sampson has gone into the printing trade.

Carter Brown expects to enter the medical profession.

The law is demanding higher and higher qualifications of its membership

The building trades are short of skilled workmen.

Banking has shown a remarkable expansion.

2. As institutions, vocations function for the individual as environment. Like other features of environment they are notably and variously selective

First, they are distinctly a factor in determining what the individual shall do. Just as an environment of deep cold water determines that an individual shall sink or swim and not walk or drive a car, so does entering one vocation determine that he shall do certain things that he may not do in another or in leisure, and that he shall not do certain things that he might do under other circumstances. If a man enters dairy farming he will milk and feed cows as he would not do if he became a floor walker in a department store or if he were seeking recreation at a moving picture show. He will not show ladies the way to the hosiery counter as he would as a floor walker, and he will not smile at the antics of Charley Chaplin as he might at the movie show.

What he will wear and when he will wear it, what he will do and when he will do it, what he will say and when he will say it, even what he will think and how he will feel, are very largely determined for the individual by the environment in which he finds himself. And vocation is no exception to the rule. For dentists' offices, law courts, machine shops, greenhouses, studios, as well as patients with mouth open in a chair, clients at one's elbow, foremen and lathe operators waiting for one, customers and employees, models and fellow artists, are as surely operative in the determination of behavior as deep water and dry land.

Second, vocations select the kind of individual who may pursue them, in terms of physical and mental characteristics. It is often possible, even in our present state of knowledge, to predict in general terms the kind of person who will be found most frequently in a given vocation, at least with respect to outstanding characteristics of race, sex, age, physique, kind and level of intelligence. For example, the following are fairly safe generalizations in the Northeastern United States:

Vocation. Dress mannequin or model.

Person.

Race — White.

Sex — Female.

Age — Young, but not a child.

Physique — Superior in bodily form and grace of movement, face not unattractive.

Social intelligence — (ability to deal successfully with persons). Normal or above.

Mechanic intelligence — (ability to deal successfully with implements and mechanisms). Uncertain, — low, average, or superior.

Abstract intelligence or intellect — (ability to deal successfully with ideas and the symbols of ideas). Uncertain. She may be moron or genius without disqualification.

Vocation. Elementary school teacher.

Person.

Race — White.

Sex — Female.

Age — Uncertain, but most likely in the twenties.

Physique — Not crippled or an invalid. May be tall, short, normal height, thin, stout or normal weight.

Not disqualified by lack of a 'perfect thirty-four' or a "face to launch a thousand ships."

Social intelligence — Above normal.

Mechanic intelligence — Normal or above.

Intellect — Above normal.

Vocation. Traffic policeman.

Person.

Race — White.

Sex — Male.

Age — Mature manhood, but not aged.

Physique — Distinctly superior in bodily strength and endurance. Normal height or above.

Social intelligence — Well above normal.

Mechanic intelligence — Normal or above.

Intellect — Normal or above.

Vocation. Racing jockey.

Person.

Race — White or colored.

Sex — Male.

Age — Young manhood.

Physique — Light, wiry, muscular.

Social intelligence — Any level from moron up.

Mechanic intelligence — Probably not below normal.

Intellect — Any level from moron up.

Vocation. Master plumber.

Person.

Race — White.

Sex — Male.

Age — Well matured.

Social intelligence — Normal or above.

Mechanic intelligence — Distinctly superior.

Intellect — Above normal.

Vocation. College professor of Mathematics.

Person.

Race — White.

Sex — Male.

Age — Mature.

Physique — Any weight from 90 to 400 pounds. Any height from five feet to seven. Any grade of beauty.

May be crippled, but not an invalid.

Social intelligence — Not necessarily above normal.

Mechanic intelligence — Not necessarily above normal.

Intellect — Distinctly superior.

Vocation. Pullman sleeping-car porter.

Person.

Race — Negro or mixed negro and white.

Sex — Male.

Age — Mature.

Physique — Normal or above.

Social intelligence — Above normal.

Mechanic intelligence — Normal or above.

Intellect — Not below normal.

Vocation. Captain of U. S. Marines.

Person.

Race — White.

Sex — Male.

Age — Mature manhood.

Physique — Distinctly superior in bodily powers and endurance. At or above normal height and weight.

Not necessarily a beautiful man.

Social intelligence — Superior.

Mechanic intelligence — Superior.

Intellect — Above normal.

Now, ours is a democracy of free institutions, but not one of us, man or woman, is free to make his choice even from such a limited list of vocations. One may have the qualifications necessary to become a dress model but not consequently those necessary to become an elementary school teacher, and *vice versa*. One may have the qualifications requisite to becoming a traffic policeman, but not a racing jockey, and *vice versa*. To have the qualifications of a professor of mathematics is not to qualify as master plumber, and *vice versa*. A potentially successful sleeping-car porter is not necessarily a potential captain of marines, and *vice versa*. And so on. Vocations do in large measure select the kind of person one must be to follow them severally, even in a democracy.

3. The various vocations are not, despite our democratic assumptions, held in equal esteem. They have different '*social status*.' The status has rarely any close relation to the value of the service to society that they render, but is a very real, if not a very tangible, influence in determining the kinds and numbers of persons who seek to enter them and who

persist in them after having entered. Few would contend that the service rendered by street scavengers, or 'white-wings,' is socially of less worth than that rendered by stockbrokers, that longshoremen contribute less than lawyers, or cooks less than 'coaches' of athletics. But street scavenging, handling freight, and preparing food for the table are, nevertheless, looked upon by the many as relatively 'low and menial.' On the other hand, buying and selling stock on commission; defending or attacking the guilty and guiltless, getting clients into legal difficulties and out of legal difficulties, with equal partiality or impartiality; preparing teams of collegians to win at football, baseball, on the track, or at rowing races; — these are activities of a high order belonging to 'the higher professions.' The undersupply of household servants and the oversupply of lawyers bears, perhaps, a closer relation to the respective 'social status' of the two vocations than to the opportunities for satisfaction and service in them respectively, apart from the factor of status. Many who might otherwise be efficient and happy in a vocation will keep out of it or leave it, because it is 'looked down upon'; many who otherwise have little capacity for service or self-realization in a vocation seek to enter it, or, having entered, hang on by tooth and nail, because it is a vocation honored in public esteem. However unjust the stigmata of approval and disapproval may be status is a very real characteristic of vocations.

4. Vocations as institutions are *changing* and *perishable*. Even in status they change. The attorney is despised in one age and the barber held in highest honor; in another age the barber is placed on a low level, the attorney on a high one. In the types they select, vocations change. In one generation men of high intellect seek the ministry or teaching, in the next they turn to medicine and engineering; in one decade able and clean-minded youths turn to 'chauffeuring,' in the next they turn away from it. Vocations also change in the problems they present and the activities they involve. Some, to be sure, are relatively stable, so that with respect to many ele-

ments we can safely predict that they will remain, ten, twenty, or fifty years hence, in essentials, — if with equal certainty not in detail, — as they are to-day. The elementary school teacher of fifty years hence will be teaching groups of boys and girls, and using books and the blackboard; the dairy farmer, fifty years hence, will plow the land, plant seed, feed cattle, plan rotations. These are not certain, but highly probable events. What the teacher teaches, however, fifty years hence, will not be in detail what he teaches to-day; the books he uses will be different in many respects, and the laboratory and illustrative impedimenta still more so; his methods will have changed. Fifty years hence, the farmer will use machines, use skills, and interpret data that are unknown to-day. Many vocations, however, are relatively ephemeral in character. They exist to-day and are gone to-morrow. That is particularly true of vocations of mechanic type in which great simplification has resulted from division of labor. It is only a matter of time and economic pressure till the man be replaced by the machine — one vocation wiped out and another established in its stead; or till the product be no longer acceptable and a new one found to take its place. The invention of the power loom, the cotton gin, and the linotype machine furnish instances of one sort; the manufacture of brewery vats, of sailing ships, and of trolley cars bids fair to furnish instances of the other, as the vocations of armorer, herald, and falconer have already done. Vocations as institutions are not static but dynamic in character.

5. Risk to health and risk of injury and death are features of environment which vary from vocation to vocation. Such hazards are recognized in insurance rates. Coal miners follow a pursuit which is distinctly hazardous both as to health and injury or death. Employees in chemical industries, such as the manufacture of explosives, poisonous gases, and arsenical dyes, are exposed to continuous risk. Plant searchers in the tropics are in an unhealthful and dangerous environment. Sailors, structural-steel workers, and state police follow health-

ful but hazardous occupations. Sweatshop shirt stitchers work in a relatively safe environment so far as injury is concerned, but in one that is hazardous to health. Injury is relatively more frequent among dairy farmers than among teachers of Latin. The postman has a more healthful vocational environment than the stoker. Actuaries have reduced the relative physical risks in occupations to a statistical basis, by which classification is made from the 'extra-hazardous' to the 'preferred.' Among the latter are those of teachers in colleges and ministers of the gospel.

But not all hazards in vocations can be reduced to tabular form. There are intangible hazards, which we may term moral risks. Even here, statistics may give some indication. Statistics of divorce and crime run much higher in certain vocations than in others. Divorce, for example, among actors and traveling salesmen, crime among detectives, prohibition enforcement officers, pugilists, bank messengers, and stock-brokers. The facts, of course, are not at all an indication of inferior 'moral fiber' among members of such vocations. On the contrary, it is to be assumed that in the long run selection works toward a higher-than-average moral stability among them. It takes, probably, less 'strength of character' to resist the temptations of the teacher and the farmer than those of the actress and the detective. But it is certain that different vocations do make different demands upon moral endowment, so that a character which will stand in one may fall in another. Intangible as they may be, such characteristics of vocation are by no means insignificant.

6. Not all vocations are, or ought to be, for their members at any time, 'life careers.' Individuals change and grow — more markedly, perhaps, in mental traits, through learning, than through mere maturing of the physical organism — so that what they are fit to do and enjoy at one period of life is not their best mode of service and happiness at another. Of a number of vocations followed by the same individual, however, every one is a factor in determining what he shall or may be-

come. Accordingly the character of a vocation, as it serves to be a stepping stone or an obstacle to growth in economic efficiency and self-realization in service, is a matter of importance.

There is probably no vocation from which an individual cannot derive learning that is useful — or at least not inimical — to service and happiness in some other conceivable vocation. Nevertheless, there are vocations which contribute very little of positive value to success in another, and which may contribute a good deal of negative value in obtaining access to certain others or following them. In common usage these are 'blind alley' or 'dead end' occupations, because they lead to nothing beyond themselves.

Illustrations of these types are invidious. Yet a suggestion of the meaning may be made. The man who, in a slaughterhouse, swings a cleaver all day in halving sides of pork is not thereby prepared in any measure to remove hides, pack cases, keep accounts, or sell hams, and certainly in very slight measure to become a retail butcher on his own account, or even a meat cutter in a retail establishment. Yet all these activities fall within the vocations of the meat industry, one of which he now follows. As a help to becoming a shoe-laster, a farmer, or a teacher, his 'experience' in vocation contributes virtually nothing. Even a relatively 'skilled occupation' may contribute little. Witness the plight of the typothetæ at the invention of the linotype, of 'mule spinners' in the present-day change of textile processes. A few years ago I met one of these latter wandering in search of work at a time when factories were 'shouting for help.' Said he: "I ran a mule spinner for twenty years at good wages. Now they treat me as of less use than a green hand."

Sometimes the habits acquired in one vocation are actually hindrances in another. Methods of handling bottles and glasses acquired by the 'soda slinger,' — so a pharmacist has told me — must be unlearned by the prescription clerk. The 'buck private' must cast aside his acquired habits of depend-

ence and of leaving responsibility to others when he attempts to set up business 'on his own' as a civilian. In just what respects of attitudes established, knowledge gained, and skill acquired the following of one vocation may prove an asset or a liability in another, nobody knows in any exact or scientific sense. But that there are vocations which, real enough both as pursuit and calling for a time, must for the individual sooner or later exhaust themselves and leave him little better or positively worse off than he was at starting, is hardly to be doubted. Perhaps none is purely 'dead end' with respect to all others; but many are relatively 'dead end' with respect to many others. In a machine-tending age 'life career' vocations are proportionately less numerous than formerly, and 'blind alleys' more common. The problem deserves scientific study.

It is clear enough, when we consider vocation in the environmental or institutional aspect, that certain minimal attributes of body and mind are necessary to entering upon every vocation. That is, the first factor in admission to any vocation is the individual as he is equipped by nature and learning. But the number, at least, of those who may enter a given vocation is limited by other factors than possession of abilities appropriate to the pursuit and an 'inner urge' to it. The most conspicuous of these factors are two: the *demand* for the commodities or services which are products of the vocation; and the possession of command of other than personal resources — i.e., the ownership or control of '*capital*' — by those who seek to enter the vocation.

There are quite definite ratios between the population of a town, county, state, or nation and the number of milliners, barbers, plumbers, dentists, teachers, and lawyers that it can support. It is obvious that the number of those who can find a vocation on the bench of the Supreme Court, as president of a university, or as ambassador to a European court, is, quite regardless of whether requisite qualifications be abundant or scarce, definitely limited by the demand for Supreme Court

justices, university presidents, and diplomatic representatives of high rank. Not everyone who may have the qualifications and the desire may become a teacher of Indo-Iranian literature, a taxidermist, a light-house keeper, or even a saddler or blacksmith. The demand for one utility may be enormous, as for bread, shoes, Ford cars, and instruction in reading; or it may be very small, as for peacocks' tongues, heraldic devices, backscratchers, genealogical research, lectures upon the habits of spider crabs, or books upon the door knobs of Pompeii. The number of those, then, who may make contributions to the production of bread, of shoes, of 'flivvers,' and of children able to read, is very large; those who may devote themselves to producing peacocks' tongues, bars sinister and lions couchants, ivory hands on flexible sticks, information as to noble ancestry, information as to the behavior of a single genus of crustaceans, and pictured descriptions of Pompeian door knobs, is very small. Moreover, the demand for any economic utility fluctuates, so that openings in a given vocation are sometimes relatively abundant and sometimes relatively scarce. In some vocations the ratio of openings remains fairly constant, being determined mainly by the factors of retirement and death of practitioners, as with college professors and bank presidents, or dairy farmers and locomotive engineers; in some vocations the ratio is extremely variable, being dependent on whim or fashion, as with mah jong teachers and 'classic dancers.' Not everyone who might succeed in a particular vocation can always find a demand for his product.

Granting, however, possession of the requisite personal attributes and a demand for the product to which the individual's abilities might be given, there is sometimes another factor which prevents access to vocation. Suppose there be in a given county room for ten more dairy farmers and one more innkeeper. It does not follow that ten young men well fitted by nature, learning, and desire to enter dairy farming may do so, or that one man with appropriate personal qualifications may become innkeeper. For both dairy farming and innkeep-

ing require 'capital' — as do all other entrepreneurial pursuits. If the fit man does not own or cannot borrow enough to finance the undertaking he must keep out of it. If the unfit man, who possesses 'capital' so desires, he may take over farm or inn and prove his own unfitness. For, though it is often the factor limiting access to vocation, command of 'capital' is not by any means the chief factor in determining persistence and survival in an entrepreneurial pursuit. Every month men become farm operators, factory owners, and merchants, who have no other qualification than the fiscal power bestowed upon them by a decedent relative or a hopeful 'dad.' Every month men drop out of such vocations because mere fiscal resource is insufficient to productive or subjective success in the undertaking. In the meantime men of personal qualification for efficient productive service and the realization of their largest personal happiness in such undertakings are kept out of them, because they lack the fiscal qualification.

It is easy to say, and probably true, that in these days the man who has appropriate personal qualifications can secure the 'capital' *if he has proved himself worthy*. Nevertheless lack of 'capital' often denies him the opportunity to prove himself worthy. Hence the factor of 'capital' still remains a limiting factor as regards access of the personally fit to certain vocations.

7. If we compare a railroad president, a division superintendent, an engine driver, and a crossing flagman, it appears that the environmental conditions of economic service — that is the situations which as producers they must meet — decrease in difficulty, variety, and complexity as we read down the list. The same we might say of the hotel manager, the desk clerk, the head porter, and the elevator boy, or of bank president, cashier, teller, and janitor, or of steamship captain, engineer, purser, and stoker. In comparing the railroad president, bank president, hotel manager, and steamship captain, or the flagman, elevator boy, janitor, and stoker, we might again choose an order, but we should not feel so sure

about it. Within industries hierarchies of vocation more or less in accord with gradations of difficulty, variety, and complexity do exist. It is probable that vocations in the total could be so classified if we knew enough about them. Indeed we do use rough traditional classifications for such a purpose — as ‘administrative,’ ‘professional,’ ‘semi-professional,’ ‘skilled,’ ‘semi-skilled,’ and ‘unskilled.’

The criteria, however, need examination before we can use them. If, by the difficulty of a situation we mean that it demands of the individual greater effort than one not difficult, then it is doubtful that a classification can be made. If we mean by a difficult situation one that fewer persons can meet successfully than in the case of a situation not difficult, then the classification can be made. For difficulty is not so much a matter of the thing to be done as of the relation of the doer to that thing. A poorly qualified or natively stupid man may have to exert great effort to accomplish at all what a well qualified or normally intelligent man accomplishes quickly and easily; a highly qualified or exceptionally intelligent man may ‘make no bones’ of a problem which to the man of less ability means a painful struggle. But there is probably a positive correlation between difficulty in that sense and the variety and complexity of situations which the several vocations present.

Variety of activities in a vocation may depend upon the range of activities in a productive unit or upon the number of productive units. By a productive unit is meant the addition of values that make a product available either to the next producer or the ultimate consumer in the normal course of events. With commodities the production of a corn crop, say of a thousand bushels, by a farmer, is an example of a productive unit which involves a long sequence and a large variety of activities; the production by a stamping die operator of a rough sole from a tanned hide, for the trimmer and buffer, is an example of a productive unit involving a very brief sequence and a very few activities. With services the changing of a woman sick from infection of the appendix to a woman well

and lacking an appendix is an example of a productive unit calling for a long sequence and large variety of activities; the changing of a man with dirty shoes to a man with clean and polished shoes is an example of a productive unit calling for a short sequence and a small variety of activities. A farmer, then, who grows only corn and cotton, or a surgeon who performs only abdominal operations, meets a considerable variety of situations. A heel cutter or shoe polisher meets only a small variety of situations. A general practitioner of medicine, whose units of production are ordinarily of less scope than those of the surgeon mentioned, includes in his vocation so many units of diverse character that his vocation may involve more variety than that of the surgeon. The ordinary cobbler or shoe-repairer, none of whose productive units is large, includes in his vocation so many diverse units that his vocation is incomparably more varied than that of the heel cutter or the shoe polisher.

In every productive unit there is some *system of activities*, however numerous and varied or few and like each other they may be. Complexity in a vocation depends upon the character of this system as well as upon the variety of activities. The system of activities whereby a supreme court justice produces a decision against the constitutionality of a State law regulating the sale of a commodity is too complicated for satisfactory analysis in our present state of knowledge; the system by which a teacher of agriculture develops ability to balance rations in a group of high school boys, may be analyzed roughly; the system by which a farmer governs his activities in producing a crop of corn may be analyzed quite intelligently — a decision to plant leads to selection of seed, which leads to plowing, which leads to harrowing, which leads to planting, which leads to cultivation, and so on, what he does in April conditioning quite definitely what he does in May, June, July, and September; the system of activities which produce a rough sole from a tanned hide is clearly analyzable — it is not much more than a 'one, two, three' series of movements. In grading vocations

according to complexity, then, not only the variety of activities in a productive unit, but the character of interadjustment of those activities, and the number and diversity of units, must be considered.

One other feature affecting scope of vocation may be worth pointing out — that is the relation of the productive units in a vocation to one another. They may be largely unlike and unrelated — as in the case of the general practitioner of medicine, who, in the same day removes a bean from Johnnie Smith's nose, vaccinates Sadie Jones, tests Mr. Brown's heart, and advises Mrs. Robinson as to a proper diet for reducing her weight; or in the case of the attorney-at-law who in one week draws a will for Colonel Jackson, collects an overdue account for Bamberger and Son, examines a real estate title for the First National Bank, initiates a suit for damages against the railroad in behalf of a truck-driver, and advises Mrs. Webber that she has no legal grounds for divorce from her husband. The productive units may be rather dissimilar in character, but coördinated to the production of one major product — as when an Iowa farmer grows timothy and clover, oats, and corn, and raises hogs. The timothy and clover and the oats are raised as means to the effective production of corn, and the corn is raised to feed the hogs, — or the hogs kept to eat the corn. At any rate the final product is hogs, and the farmer consumes timothy and clover, oats, and corn, which he has produced, in order to produce hogs fit for market. Or the productive activities may be similar in character and not closely related — as in the case of the specialist in abdominal surgery. Operations for appendicitis, for gall-stones, for floating kidney, for adhesions, for gastric ulcer, are by no means identical, yet many of the activities called for in each are the same — anæsthesia, asepsis, sponging, tying blood vessels, incision through the abdominal wall, and so on, for example. But to remove gall stones from Mr. Avery does not at all imply that his wife must come up for removal of her appendix — or, indeed, that the surgeon will ever use his knife again. The

units of productive service are quite independent. Vocations, then, in respect to the productive units they involve are relatively heterogeneous, relatively integrated, or relatively homogeneous and not integrated.

Now such characteristics in a vocation have a bearing not only upon the type of individual who may enter it, but also upon the relative efficiency of vocational institutions and upon opportunities for self-realization by their numbers. Discussion of such implications is for the present reserved, but suggestion may be made here of the three main implications. (1) According to its variety a vocation demands versatility. According to its complexity it demands exceptional abilities. The difficult vocations are those which select the superior qualified few. (2) In the degree that a vocation is of large scope it is incapable of standardization in process and product. Since standardization is a direct factor in productive efficiency, efficiency in the more complex vocations is less than in the simpler vocations. Law, medicine, teaching, and administration in business or government, are less efficient, as economic institutions, than the mechanic trades and machine tending pursuits. (3) The more varied and complex a vocation is the more it demands of genuinely human activity; the simpler it is the more it demands of merely mechanic activity. Our railroad presidents cannot conceivably be replaced by machines; our crossing flagmen are being replaced by machines. We are not in sight of mechanical captains of ocean liners; we already have mechanic stokers.

Every vocation involves repetition of the same elements of productive activity from time to time. In some, however, complete repetition of the same activities in the same sequence and the same system, may rarely be called for — as, for example, in the case of the supreme court justice. In others it is fairly frequent, but the 'turnover' is slow, as in the case of the farmer. In others it is more frequent and more rapid, as with the abdominal surgeon. In others still, — and these are very numerous — it is very frequent, and very rapid — as with the heel cutter or the orange wrapper.

In the degree that repetition is irregular and slow in a vocation it demands human rather than machine resource — it is 'stimulating' or better, as Doctor Frederick G. Bonser has put it, it is "energizing." In the degree that it demands mechanic rather than human responsiveness on the part of the producer it has been called, suggestively, if not quite accurately, 'deadening.' In the incidence of these two characters vocations exist in all gradations.

Simplicity in vocations is closely associated with repetitive character. The factory bench and machine tending vocations exemplify the characteristic of repetition abundantly. But the characteristic is relative only. The tonsilectomist who cuts out a hundred pairs of variously swollen tonsils in a week, and the bookkeeper who turns in a 'daily balance sheet' for the merchant differ as to repetition only in degree from one another and from the heel cutter and the orange wrapper. Routine is a marked characteristic and a very significant characteristic of many, perhaps a majority of vocations.

8. Common usage breaks up vocations into three classes, professions, businesses and trades. The products of a profession are in general non-material or service utilities; those of a business may be either commodities or services, and business is entrepreneurial in character; those of a trade are material and relatively completed utilities in which manual skill contributes largely to values. The distinctions, however, are very vague and unsatisfactory. A man whose main product is service, like an insurance agent is in 'business,' and the sales clerk behind the counter, who is not an entrepreneur at all, is in 'business' as well as his employer; an opera singer has a profession, but a 'barker' for a 'side show' has a trade. In reality the distinction is traditional and hardly a matter of the character either of productive activity or of product. Vocations which are, or have been, followed largely by those of the ruling or privileged classes are professions; those followed by *hoi polloi* are trades. Profession carries with it an odor of

distinction; trade reeks of the deme. Business is *bourgeois*, and between the other two.

A suggestion, however, of two differing and significant aspects of vocation appears in the extremes of long recognized professions and long recognized trades — as, for example, in the profession of law, on the one hand, and the trade of the plumber on the other. The situations which the lawyer meets are largely unstable and unpredictable in any very exact fashion. That is because they are made up chiefly of persons and ideas, or the symbols of ideas, which are variables. The situations which the plumber meets, however, are mainly conditioned by material things, and consequently are relatively stable and predictable. Clients, juries, judges, and ‘evidence’ are much less *fixed* and *controllable* components of situations than are pipes, tools, lead, oils, faucets, drains and traps.

Individuals, at any given time, obviously differ from one another. Mrs. Smith is likely to be a very different factor in a situation as witness or client from Mr. Smith, her husband, or her sister Mrs. Brown. To question these persons severally on the stand concerning the same facts is to meet a different situation in each case; to hold a conference with them severally on the same matter is to deal with different situations. Moreover, Mrs. Smith is a variable from moment to moment. She presents one problem before lunch and another after lunch; she is not the same after answering one question as she was before that question was asked. Just what Mrs. Smith will feel, think, say, or do in response to a certain question, statement, letter, or act on the part of a lawyer cannot be predicted or controlled with any such accuracy as what lead will do when heated, what a gasoline torch will do when lighted, what a wrench will do when applied, what a drain will do when placed, and so on, in response to an act of a plumber. Things are much more to be relied on as constants in our dealings with them than are persons.

An idea, of course, is purely subjective and exists only in the mind of the person who has it, and rarely there twice the same.

But the symbols of ideas, words spoken, written, or printed, pictures, etc., are common property and as immutable as the plumber's tools. Nevertheless, because the symbols of ideas function only as they express or call forth ideas — the same thing — they constitute extremely variable elements in environment. Every word or sign is susceptible to individual interpretation. What that interpretation will be in a given case cannot be predicted with uniform and absolute certainty.

For example, consider a symbol already frequently used in our discussion — *case*. *Case* when I use it, stands for an idea in my mind. But according to the experience, habitual attitude and present set of mind of the person who sees it, it will mean one thing or another — summon an idea in his mind like that in my mind, or variously different.

In terms of his characterizing experience and his habitual attitude *case* means to a lawyer one thing, to a physician another; to a bootlegger one thing and to a poultryman another; to a dealer in luggage one thing and to a teacher of Latin another; — it summons for each of the six persons mentioned an idea different from that called to mind by any other. But suppose that the lawyer has a daughter ill in the hospital, or that he has an alcoholic thirst, or that he is about to lay in a supply of 'water glass eggs' for next winter, or that his brief-carrier has been lost and he needs another, or that he is helping his son in preparing for a college entrance examination in Latin; then clearly his present set of mind is quite as likely to determine his interpretation of the symbol as his habitual attitude, and to cause him to make a different interpretation. One would have to know the history of his life and the details of recent events with him to make a reasonably safe guess as to which of many interpretations he would make of the symbol *case*. Now not all symbols may stand for as many possible ideas as this one, but the principle holds, nevertheless. When we use a symbol we cannot be sure of the result in the same way as when we strike with a hammer a nail pointed into soft pine.

Now it is not to be suggested that the follower of a profession

like the law deals only with persons and with ideas and their symbols, or that the follower of a trade like that of plumbing deals only with things. There are few situations in which only one element — person, idea, or thing — enters. Nevertheless, persons and ideas, in spite of rubber stamps and legal forms and pens, do more to characterize the vocation of the lawyer than do things; dealings with tools and materials do more to characterize the vocation of the plumber than dealings with persons and probably with ideas also.

If such a distinction is well founded, then we may say that such part of a man's vocation as calls for the meeting of situations not fixed and stable — i.e. in which persons or ideas or both play a dominant part — has a *professional* aspect; such part as calls for the meeting of relatively fixed and stable situations — i.e. in which material things play a dominant part — has a *trade* aspect. Very few vocations — as institutions — are totally lacking in either aspect. And the implications of the two aspects for education are, as we shall see, of very considerable importance.

At this point it may be well to say a word about standardization. Similarity of wants on the part of many persons makes possible the standardization of utilities — such as shoes of No. 8 size and mother-in-law jokes. Of that more will be said in discussing the organization of economic society. But stability of the environment of production makes possible standardization of productive processes. Our 'increasing control of environment' of which so much is heard in elucidations of 'progress,' is very much a matter of stabilizing the situations we meet in life. It reaches its maximum in the factory, wherein temperature, ventilation, lighting, the height of the bench, the speed of the carrier and the machine, and the spatial relations of materials, tools, machines, and so on, are so controlled and regulated that the worker — heel cutter, buffer, driller, trimmer, stacker, packer, bolt setter, inspector, as the case may be — comes on Friday morning to 'exactly the same job' he left on Thursday afternoon, to 'the same job'

in December as he had in July. We have not yet succeeded in controlling the weather and the processes of ontogeny and phylogeny in plants and animals so as to provide for the farmer hour after hour or day after day a stable environment in which to produce, but we have made some advance in that direction. In specialized lettuce growing, for example, it is possible for a man to work the year round at transplanting seedlings from 'flats' to 'beds.' The basis of specialization in medicine is that of the factory and the greenhouse. It is the attempt to provide that the producer shall meet as nearly as possible the same fixed situation over and over again — and, in so far as the human body is a constant it is successful. Standardization of learning in pupils is sought by installation of uniform syllabi of courses, uniform texts, uniform examinations. In so far as human needs, capacities, experiences, are identical it is successful. Law courts and college deans set up rules and regulations, or fixed features in the situations with which they deal, in order to avoid the painful necessity of judging cases on their merits. Churches prescribe the doctrines which their preachers shall accept and preach. The cult of efficiency achieved through fixation of the coördinate stimuli of environment has gone so far that 'standardization' appears in vocations in which it is inherently impossible and distinctly inappropriate. In the professional aspect of any vocation an attempt at standardization is out of place.

9. It is still common to attribute a good deal of significance, especially in a democracy, to the distinction that sets off the vocation in which the worker is 'independent' and 'working for himself as his own boss' from that in which he is an employee of another and under the direction of one superior in authority. The physician, the attorney-at-law, the merchant, and the farmer, are, in this view, relatively free to determine what they shall do and when they shall do it, as compared with the teacher, the engineer, the sales-clerk, the machinist, and the farm hand. Such 'independent workers' own 'their own jobs' whereas the employer must find 'a job' owned by another in which his

activities are more or less subject to dictation. Thus a few vocations among the 'higher professions' and the vocations of 'ownership and management of capital' or entrepreneurial vocations, as a whole, form a group of greater democratic opportunity than do the vocations of employment at salary or wages. Indeed one of the indictments of this 'modern and materialistic age' is that it is fast reducing us all to a condition of 'wage slavery.'

Now it is undoubtedly true that in some vocations responsibility for the ultimate product is less divided than in others, and that in general the gradation of such responsibility may correspond roughly to such a classification as has been suggested above. But an implication that the physician and the farmer, for example, are free to ignore the wants and wishes of others as the factory hand and the sales clerk are not is false. The hours and activities of the physician are controlled as fully by the demands of his patients as are those of the machinist by the orders of foreman and superintendent. Otherwise he ceases to be a physician in more than name. He has not one or two 'bosses,' but scores. They are as free to 'hire and fire' as the room foreman and factory superintendent — usually more so. The manner of their control of the physician's time and activities is different from the manner of the foreman's control of the activities of the lathe operator, but not less real. The farmer, again, exposing 'free heart and free forehead' to the elements and man, stands as the symbol of democratic independence. No man dictates to him. But what he grows depends upon what people will buy, and what he grows determines what he shall do and when he shall do it. Assume that he produces milk — there being customers for milk accessible. What the standard of milk shall be the law prescribes — which immediately conditions his activities with respect to the kind of cattle he may keep. If they fail to produce '3%' milk, he cannot sell the milk; if they are tuberculous he can neither sell the milk nor keep the cattle. There are 'bosses' with authority who see to these things. If he does

not keep cows and utensils clean he cannot sell the milk, — perhaps if he does not own an approved 'milk house' and use it properly his milk may be refused. If, because a distant city has 'gone on daylight saving,' the train schedule is set an hour earlier on 'God's time' he must adjust his schedule of feeding, milking, and delivery to that change. The idea that apart from the demands of weather, growing crops, and animals, non-human 'bosses,' the farmer is 'free' to do as he chooses is pure fiction. The wants and wishes of others he cannot ignore and remain a farmer.

No producer in any vocation is unconditioned by the activities of others. The mere fact of specialization which makes him an economic producer implies a restriction of freedom to do as he chooses. Vocations exist in which income does not take the form of salary or wages and in which the producer 'manages himself'; but such vocations are not independent. Dependence upon others is characteristic of every vocation, and dependence means a conditioning of productive activity by others. The employee is not necessarily more restricted than the man who 'works for himself.' Indeed, as has been suggested, no man can, in vocation, 'work for himself' — for vocation institutionally is an environment of economic production, producing goods for others.

SUMMARY ABSTRACT

1. Vocations are not merely individual, but institutional in character. They are environments as well as activities

2. As environments vocations are notably and variously selective. A vocation is selective first with reference to the kind and number of the activities of one who enters it; second with regard to the characteristics of the individual who may follow it. No individual within a vocation is wholly free as to his activities; no individual in society is not by his characteristics barred from some vocations.

3. The social esteem in which vocations are held is quite unequal. The status is not necessarily correlate with the social significance of the function performed by a vocation.

4. Vocations are dynamic and changing in character. Some are rela-

tively permanent and stable; others are short lived or in rapid flux. Activities and qualifications appropriate to success at one stage of the development of a vocational institution may not be appropriate at another.

5. Vocational environments involve quite unequal hazards to health, to life and limb, and to mental or moral welfare.

6. A true vocation at one period in the life of an individual may not be such at another. An individual may outgrow or fail to keep pace with the opportunities of a vocation in which he once had a proper place. A vocation neither is nor ought to be in all cases a 'life career.' Experience in one vocation may prove an asset in another vocation; in still another it may prove a liability. Some vocations are relatively 'blind alleys' leading nowhere beyond themselves; others open many profitable outlets. The demand for the products of a given vocation is a factor in determining the number of openings to it. So, too, the requirement of material resources or 'command of capital' may prevent those otherwise fit either from entering certain vocations or proving the fitness that they have to enter such.

7. Vocations vary in the difficulty of the situations they present to workers. They vary too in the number and variety of activities that they demand or allow. In difficulty and scope vocations grade from easy and simple to difficult and complex. They demand abilities in range from simple mechanic habits to an enormous social and intellectual versatility.

8 The distinction between 'trade' and 'profession' is chiefly traditional. But at the extremes the recognized trade and the recognized profession do suggest important characteristics to be found in many, probably in most, vocations. When the situations of a vocation are stable and predictable so that they demand adaptation in terms of fixed habit the vocation presents a 'trade' aspect. When the situations are unstable and variable so that education can contribute no more than to a generic adaptiveness in meeting them, then the vocation presents a 'professional' aspect. When material things constitute the chief elements in the situations to be met the 'trade' aspect looms large; when ideational and personal factors are the chief conditioners of the situations to be met, then the 'professional' aspect is primary. At least, there is a distinct correlation between the demand for fixed habits and the parts played by things in a vocation, and a distinct correlation between the demand for adaptiveness and the part played by persons and ideas in the vocational environment.

9. The distinction between the vocation of the 'free and independent' worker and that of the 'wage slave' is largely a traditional fiction. The 'professional man' or the 'entrepreneur' may be more limited in the use of his time and the direction of his activities than is the employee who works under the personal supervision of a 'boss.'

CHAPTER V

VOCATION FROM THE SOCIAL STANDPOINT

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. In what respects are the relations of first-grade teachers with first-grade teachers coöperative? Of barber with barber? Of haberdasher with haberdasher? How far are their relations competitive?

2. In what respects are the relations of the first-grade teacher with the second-grade teacher or the school principal coöperative? Of carpenter with plumber and painter? Of the general practitioner of medicine with the dentist or surgeon? Of the ship's engineer and the pilot? How far competitive?

3. How would you distinguish a group product from an individual product? If one bricklayer working by himself lays ten feet of a brick wall, and ten bricklayers working at the wall lay a hundred feet, in which case would you consider the product a group product? What individuals constitute the group?

4. Does the W. L. Douglas Shoe Company coöperate with or compete with the Hamilton-Brown Shoe Company? Does either company compete with the United Shoe Machinery Company? Does the New York Times Company compete with the International Paper Company?

5. What is an industry?

6. What is the economic state?

VOCATIONS, CONCERNS AND INDUSTRIES

1. Vocations are, in one aspect, economic institutions. But not all economic institutions are vocations. Economic institutions are often organizations of intercontributory vocations, and hence have a plural membership. But vocations need not have a plural membership. There is, for example, but one individual in the vocation of President of the United States. But in most cases vocations do provide environments for numerous individual producers. Again vocations need not involve, and seldom do involve, an organic interplay of pro-

ductive activities among their several members. They are, rather, characteristically parts of organized economic groups instead of being economic groups in themselves. The co-operative relations of their members are with members of other vocations rather than with one another.

There is, perhaps, no accepted word that is apt to characterize groups of producers from different vocations systematically organized for the production of some utility of service or commodity. Popular usage, however, supplies one that is suggestive — the word ‘concern,’ in its Latin origin indicating a group striving to a common end. It is thus quite accurately indicative of character in such expressions as ‘a manufacturing concern’ or ‘a theatrical concern’ or ‘a ship building concern.’

A shoe manufacturing ‘concern,’ for example, is a group of members from a large number of vocations, such as laster, stitcher, eyelet machine operator, etc., which are in systematic contributory relation to one another in completion of the commodity shoes. It is not the mere aggregation of producers, but the organic relationship that makes the group a ‘concern.’ So, too, a symphony orchestra is not a mere assemblage of instrumentalists, but a coöperative group of specialists from several musical vocations, each of whom contributes in systematic relation with the others a part in the product — a product of the whole group and not a mere sum of sounds from pianist, cornetist, flute player, violinist, drummer, and so on. A professional baseball team is again an organization or ‘concern’ and not a crowd of nine ball players. The second baseman of the Chicago ‘Cubs’ and the second baseman of the Baltimore ‘Orioles’ belong to the same vocation, but not to the same ‘concern.’ What the second baseman of Chicago does in a game contributes nothing to the product of the Baltimore team, and conditions in nowise the activities of the second baseman of the ‘Orioles.’ On the other hand the part played by the second baseman of Chicago is in systematic relation with that of Chicago’s first baseman, short-stop, catcher, and the rest of the *team*, each of whom follows a

different vocation, but each of whom is a part in the 'concern' which produces a spectacle of skill in the national game for the edification of Chicago's 'fans.'

When we speak, then, of the necessity that a man shall 'coöperate with his fellows in the craft' to the end of useful production, the term 'craft' must be extended to include members of organically related vocations within a 'concern' rather than restricted to a specific vocation. Indeed shoe laster seldom coöperates with shoe laster, pianist with pianist, or second baseman with second baseman. Only in vocations of considerable scope, wherein each member possesses a range of productive abilities from which he may select one or another for repetitive use when group action is called for, does co-operation among members of the same vocation become at all likely. Thus a number of carpenters called together to build a dwelling may divide their labors cooperatively, though each of them is capable of doing any of the jobs of house construction in wood. One may set studding, another cut rafters, another nail laths, another lay flooring, and so on, because a group so organized can produce a dwelling ready for the masons, plasterers, and plumbers, more efficiently than can a company of carpenters each performing every operation. In such a case we have actually a 'concern' of specialists for the time being, and such a 'concern' represents an incipient division into several vocations. Indeed there have already split off from the vocation of house carpenter those of lather and floor layer.

2. Now just as individuals in a given vocation for the most part compete in production instead of cooperating, so 'concerns' devoted to the production of the same or very similar products tend to compete rather than to coöperate. One shoe manufacturing 'concern' does not characteristically coöperate with other shoe manufacturing 'concerns' in producing shoes. One symphony orchestra does not coöperate with another in producing music for the delectation of paying audiences. The 'Cubs' do not coöperate with the 'Orioles.'

The 'concern,' however, is most frequently a member of a more or less loosely organized group of 'concerns' severally devoted to the production of different utilities. Such large and loose and often highly complex organizations go by the appropriately loose name of *industries*. Thus we have a boot and shoe industry within the leather industry, a 'National League' and an Eastern Association within the industry of 'organized baseball' over the destinies of which Judge Landis is supposed to preside. It is, perhaps, shocking, because of the 'artistic' aura that surrounds the production of music, even by professionals, to apply the term industry to the organization of musical and other 'entertainment concerns.' But some such organization does appear in the 'circuits' and 'producers' associations' of that field of art.

Definite systems in coöperative organization for production is as evident in some industries as in many 'concerns.' 'Concerns' making tires, others making carburetors, others making batteries, others making bodies, others making wheels, and so on, are as clearly intercontributory to the making of motor cars as are the several vocations organized in a shoe manufacturing concern, the several musicians in an orchestra, or the several players on a ball team. Looseness of organization is not essential to distinguishing industries from 'concerns.'

A man following his vocation is seldom a member of more than one 'concern.' But a 'concern' may be a constituent member of more than one industry. Thus a tanning 'concern' may be an integral part of the automobile industry and of the shoe industry. So far as responsibility goes it is equally answerable to the dependent concerns of either industry. For dependence of either the automobile industry or the shoe industry upon the tanning 'concern' is direct. If the tanning concern fails in production, then, at worst the character of the final product, motor cars, or shoes, must be changed, so that, for example, we must sit upon seats lined with treated cloth instead of leather, or wear shoes of '*ersatz*' materials instead of leather shoes. At best delay and disorganization of the

process of making automobiles or of making shoes must result.

3. As between industries, also, intercontributory relations are often closely systematized and direct. The petroleum industry and the motor car industry furnish a multitude of examples. Consider the effect of the demand for volatile fuel upon the production of gasoline, or that for lubricants upon the production of heavy oils and greases; or *vice versa* the effect of low grade gasoline upon the manufacture of carburetors and ignition systems in motor cars. A change in the amount or character of output in either of these two industries is at once reflected in the other, so closely are they intercontributory. Certain industries so directly condition productive processes in many others that they are called *basic industries*. The coal and iron industries are thus basic. A failure in the coal industry has immediate and serious effect upon transportation and manufactures in a multitude of other industries. The 'barometer of business' is found in the iron and steel industry because iron and steel are conditioning factors in the production of ten thousand utilities.

In the matter of production, then, there is direct organic relation between vocation and vocation, 'concern' and 'concern,' industry and industry. It is not always easy, however, to place a given vocation or a given 'concern' in such a system. A lighthouse keeper, for example, is not a member of a readily discernible 'concern,' nor is a 'concern' producing tombstones from a marble quarry readily to be placed in an industry. But, even in the so-called 'higher professions' the trend to direct dependence between producing individuals, groups of individuals, and groups of groups, appears. One who suspects his sufferings to be due to neuritis or rheumatism may soon discover, if his pocket book be well filled, the extent to which the several professions in medicine are integrated.

Indirectly, as changes in productivity occur among vocations, 'concerns,' and industries, they affect one another through influence upon demand for products—that is, influence upon the consumer. The illness of one skilled mechanic

in a cotton gin factory threw all departments out of work for a fortnight, and the consequent slacking of demand for lunches at a nearby 'stand' put the owner 'out of business.' A broom factory in Illinois burned, and the demand for carpets from a New England mill so decreased that a considerable number of employees was discharged. A strike in the coal fields found an echo in the ranges of the West. The demand for 'feeder cattle' slackened appreciably.

In sum, then, vocations make up not a chaotic aggregate of producers, but an organic system of coöperative activities in production. This system we know as *economic society* or, perhaps more accurately, as *economic civilization* — the function of which is to supply the economic wants of the world. The producing constituents of economic civilization are largely, also, the consuming constituents of human society. Accordingly the characteristics of the economic system condition the well-doing and the well-being of every — or very nearly every — human being.

SUMMARY ABSTRACT

1. A vocation as an institution does not always, or even characteristically, constitute an organized group of producers. The productive activities of its members are alike, but not often are they coöperative. In general, however, the individual producers in a vocation are members of organized economic groups, which, for want of a better term, may be called economic 'concerns.' In a 'concern' the activities of members are different but coöperative to the production of some group product of commodity or service — e.g. men's shoes or orchestral music.

2. Again 'concerns' do not commonly coöperate with 'concerns' devoted to the same or closely similar products. But they do have direct intercontributory relations with 'concerns' devoted to different utilities from those which they themselves produce. Thus they become constituent members of organized industries.

3. The more or less loosely organized groupings of 'concerns,' known as industries, have, in turn, both direct and indirect relations with one another. The intercontributory and conditioning relations of industries, 'concerns,' and vocations determine the organization of that complex whole which we know as the economic state.

CHAPTER VI

EDUCATION AND ECONOMIC SOCIETY

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Trace the origin and spread of any implement, machine, productive practice, vocation, with the history of which you are acquainted — e.g. the safety razor, the vacuum cleaner, the resoling of shoes, the principalship of the high school.

2. Trace the origin and spread of any species, breed, or variety of plant or animal with the history of which you are acquainted — e.g. the corn plant or Black Mexican Sweet Corn; the domestic hog or the Poland China breed of hogs.

3. In what respects is the manner of origin and spread of the same sort in the cases you have traced under 1 and under 2?

4. What features in the process of origin and spread under 1 are matters of learning?

5. What possible function of vocational education is suggested by your analyses and comparisons?

EDUCATION AND ECONOMIC CHANGE

1. Economic life is very much a matter of vocational 'folkways.' The process of change and survival among those folkways conditions in large measure the welfare of society. If education is to serve for the guidance of that process the beginning lies in an understanding of it, however meagre. Some light is thrown upon it by the analogy between biologic and social evolution. That neither in biologic evolution nor in social heredity are we yet able to speak in terms of ultimate causes does not mean that the contribution of present theory is useless. We know that the biologist has effected through his theory an apparent rationalization of the ways of the Creator that is intellectually satisfying. We know that he has gone further than that. Already by virtue of the evolutionary

hypothesis he has placed a hand upon the tiller and has set the course of the ship in the case of many a minor organism from the fruit fly to the horse. That his theory illuminates the social process is undoubted; that it may furnish a way to the conscious betterment of that process is likely. The similarity of the following cases is not wholly fanciful.

The common locust as found among the sand dunes along the sea-shore shows a decided departure from the type of the open fields of the inland. Not only are the great majority of specimens found toward the close of summer a light sandy color, but the newly matured generation of the earlier season also. The order of color distribution found both at the beginning and the end of the season as compared with the many dark and few light specimens of the inland fields is quite reversed.

In any ten thousand of the progeny of a hundred locusts of uniform color there are always a number of variants from the type, lighter or darker in several degrees than the parent group. Assume now an equal distribution of the light and the dark in such a generation and place them among the sands of the dunes. Against those sands the dark specimens are conspicuous, the light specimens inconspicuous. Now many birds find locusts appetizing, and birds hunt by sight. The sand-colored locust has a better chance to survive than his darker brother or cousin. Among the *variations*, says the biologist, environment is *selective*, favorable to some and unfavorable to others. In this case it tends to select for survival in any generation the light or sand-colored variants.

Mating time comes after the slaughter has been going on for some weeks. That the sand-colored locust is more likely to find a mate among the light colored than among the decimated ranks of the dark is obvious, so that the proportion of light matings will be greater than that of dark matings. But by the law of inheritance 'like tends to beget like.' Of the offspring of a light colored mating a greater proportion will be light colored than from other matings. Hence the second generation will be in larger proportion light than was the original thousand.

Assume the same tendencies in selection and in begetting for a thousand or ten thousand generations and the difference between the locust of the sand dune and the locust of the stubble field is understandable. Variation, selection, and inheritance in interplay account for the change.

Twenty years ago one man in 'four hundred' wore a coat shirt. It was the tailor-made 'dress shirt' appropriate to those special occasions upon which his hair must be painstakingly smoothed and protected from mussing. Fifty years ago every man pulled his shirt on over his head. Now all that is changed. If you, as a conservative, must pull your shirt over your head, you must button it first. Every man now wears a coat shirt on occasions when a shirt is worn.

There is no shrine to mark the place of origin of the first coat shirt; it has no date in the school histories as do the steamboat, the cotton gin, and the grain binder. The event occurred, nevertheless. Somebody, by accident or by design, it makes little difference which, invented a coat shirt — originated a variant from the shirt type. The glory is attributed to a drunken journeyman in the employ of a custom shirt maker purveying to a fashionable clientele. This man was set to work upon a pair of shirts ordered by a leader of fashion. In cutting them, either because of the fog of liquor or by a stroke of genius possibly attributable to the liquor likewise, he failed to stay his shears at the traditional dead line, but clove his way mercilessly to the border. Undismayed, or delighted, as the case may be, he went on to hem and complete the garments, pressed and folded them and sent them to the beau as directed by his master.

On the following day the master was astonished to receive a visit in person from his august patron. That gentleman complimented him upon his amazing ingenuity in devising a shirt so appropriate to the needs of him whose hair must be carefully managed, ordered a dozen new shirts of identical pattern, and promised to recommend both the shirts and their maker to his friends among the élite.

Doubtless, he kept his word, for the demand spread among the chosen. Environment proved favorable to the survival of the variant. For years the 'exclusives' kept the proud secret and the coat shirt remained a possession of the man of fashion and of the guild of the custom haberdasher. But the evil day arrived. How and when the invader broke in deponent saith not. One has surmised that a shrewd cabby, rearranging the habiliments of a dishevelled 'fare,' made the discovery and retailed it to an outcaste factory shirt-maker. At any rate some such fellow did come upon it, saw both manufacturing and marketing advantage in it, instructed his foremen, put on a campaign of advertising, and the deed was done. The coat shirt became a common, as it will probably become a vulgar possession of civilization. As with so many of our social customs, standards, and institutions, the every-day shirt has changed to a new species.

In explaining the process of change, however, the sociologist does not use the terminology of the biologist. The social variant is innovation or *invention*, the social selective factor is *sanction*, and the social like-begetting is *tradition*.

a. The essence of invention is the "using of old things in new ways." No shirt could have been split had there been no shirts and no shears. None could have been split and hemmed had no man possessed the skill to use shears and needle. Not even the idea of the coat shirt was possible except with the possession of the ideas of shirts and coats. No shirt could have been split and hemmed had no man possessed the motive to make shirts. But men are not born with the skill to make shirts, the idea of shirts, or the desire to make shirts. All the processes modified through the invention of the coat shirt were learned — they were the "old things" upon which the invention was based. The new way of using them was itself an act of learning. If not no second shirt would have been made.

b. The customer who first approved the invention was not born to recognize and find delight in a coat shirt. He must learn to want such a shirt. This he might do by trying on the

shirt, by observing the shirt and judging it in terms of his experience (what he had already learned) as a wearer of shirts, or in other ways. But learn he must. Sanction, like invention, is a matter of learning.

c. The customer recommended his shirts to his cronies and they in turn passed on the recommendation to their cronies. The master 'told' or 'showed' his journeymen and his fellow guild members the secret. The cabby passed the good news — what by good luck he had learned — to his friend. The manufacturer 'instructed' his workmen; he 'advertised' that men might learn to want what before they had not wanted, his coat shirts. Customers and competitors again passed on the new thing. 'Giving over,' tradition, 'social inheritance' is again a process of learning.

Everyday experience of fashions in dress and in manners will enable the reader to multiply examples. The history of customs, ideals, and practices in vocations points to a like process and a like explanation. Learning as a possession and as a process is the central and essential fact of economic as of all other social evolution. Since education, whatever else may be said of it, has clearly to do with what men learn and the manner of their learning it, educators may hold reasonably, and perhaps hopefully, that they may have a hand in the evolution of economic society.

2. Often in the attempt to put old things together in new ways the inventor hits upon the combination by accident. Goodyear is said to have discovered the process of vulcanizing rubber by the accident of dropping some of his trial mixture of sulphur and caoutchouc upon a hot stove. Caoutchouc, powdered sulphur, and glowing heat were old and familiar things. But the bringing of them together in a new way was the invention or discovery of Goodyear. Invention means literally to come upon, to find, to discover, and in a very true sense all inventors are discoverers rather than creators of new combinations of old things and old ideas.

Franklin with his lightning rod put together familiar facts

of electrical action. No part of Howe's sewing machine was really new. Even the essential feature — the needle with an eye at the point — was but a combination of old features. There existed needles, needles with flexible shafts, needles with eyes for thread, but no flexible needle with an eye at the point existed till Howe hit upon it. The transmission of current over a wire, the magnetizing and demagnetizing of iron by such a current, the production of movements of an arm or sounds by vibration of a diaphragm, were all familiar things before Morse hit upon the new use of them in the telegraph instrument and Bell in the telephone. The history of invention in material things, of innovations in conduct that became customs, of new theories and hypotheses that become the bases of science and philosophy — from the Copernican theory of the universe to the Darwinian theory of evolution — reveals always the reconstruction, whether by accident or design, of old elements into new combinations, the use of what men already knew in a way they had not known before.

3. In the history of innovations it appears again and again that mere sanction has been difficult to obtain. In the Middle Ages men often prosecuted their searches for the new in secret. Merely to search for the new was sinful and intolerable. The promulgator of a new device or of a new interpretation of the phenomena of life sometimes paid for his daring with his life. Even now such a one may pay for it with ostracism or worse. Franklin's lightning rods were condemned as impious interferences with the designs of the Almighty. If He chose to exercise the prerogative of Jove and burn a barn with a thunderbolt, it was no Christian work to interpose a deflector in the pathway of destruction. Women to whom the sewing machine proved a great blessing condemned at the start the machine and its inventor as destroyers of the last resource of the poor widow — her skill with the needle. For years the iron ploughshare was a device of evil to poison the soil. Bobbed hair and short skirts were not long ago potentially destructive of all character and moral responsibility. Always many have disapproved

of every invention. Many a device and many a theory that might in its time have been, or later came to be, of inestimable value in forwarding human welfare, has perished for the time, at least, with its discoverer. Change in productive processes or in economic ideas does not even begin as a social process until some measure of tolerance or approval has been granted to the new.

4. The spread and persistence of a new mode of production depend upon two things: the existence or creation of an effective want for the new mode; and a knowledge of the new mode or invention itself. There is always, of course, a potential want for the new thing, or process, or idea; otherwise any sanctioned invention dies barren of social results. But always, too, that want must be made definite and effective — so that, for example, men will not want vaguely some method of harvesting grain more cheaply, some method of sewing less exacting, some method of writing more rapidly and plainly, or some method of speaking to friends at a distance, but will desire and be willing to give recompense for McCormick reapers, Howe sewing machines, Remington typewriters, and Bell telephones. In other words the invention must propagate.

On the part of those who take up a new mode, of production, of dress, of manners, or of what they are pleased to call thought, this propagation is usually a simple and incidental process of learning by imitation. Farmer Jones sees a reaper at work on the farm of a neighbor and notes that it does its work well and at a great saving of time and effort. At once his want becomes effective. He wants, not just to reap his grain more economically; he wants one of those reapers Smith uses, and he buys one. In turn others acquire from him the specific want, and others from them again, so that the demand for reapers increases and the use of the invention spreads. Mrs. Watson hears that Mrs. Robinson has tried a sewing machine and likes it. She 'goes over' to see it operate, and approves of the work it does. Another sewing machine comes into use. Banker Furniss receives a neatly printed letter from banker

Wilson. He makes inquiry as to how the thing was done, and learns that the letter was written on one of those 'new-fangled' typewriters. He decides he must have one; another typewriter comes into use and another centre for the propagation of typewriters is born. This is, crudely, the principle of imitation, which Comte first proposed as the primary method of propagation of social changes.

The creation of effective wants and knowledge of the specific means to satisfy them, which make for the spread of inventions, are not, however, always results of direct imitation. In these days skillful advertising, or 'campaigns of education,' for the stimulation of demand does much to speed the process. Word of mouth, as well as the printed word and picture, makes for propagation. Whether, nevertheless, the tradition or passing on of the new thing be direct or indirect, it is always due to someone's learning to want and to use what he has not wanted or used before. Propagation of the new by the producers of it is ordinarily a purposeful and definite process of education — whether the new thing be a lipstick, a tractor, or a method of coöperative marketing. When a Paris dress-maker puts out a new type of dress he secures, if he can, a well known and attractive woman to wear it, — a noted actress, a princess, a leader of fashion. If he cannot, he does the next best thing, and hires a beautiful mannequin to wear it in promenade of the streets of the fashionable quarters. Never does he put his 'new creation' on an obscure and unattractive woman. For obscure and unattractive women are not imitated in their dress. The vogue of bobbed hair is due, perhaps, more to the influence of Mrs. Vernon Castle than to its common sense utility. A concerted 'bobbing' by all the sane and homely 'female physicians' in America would, it is hardly to be doubted, have had far less influence on the spread of the fashion than did its adoption by a well known and beautiful dancer. If the Queen of Rumania can be prevailed upon to use a new dentifrice, and if that fact be broadcast in the press of the world by paid advertisement, it will sell more tubes,

probably, than an Associated Press dispatch announcing that the prisoners of Sing Sing have gone on strike to force the warden to furnish them with the same tooth paste. To secure the 'backing' of people whose practices command attention and approval, whose opinions are heeded, in short, of people of 'influence' is one of the commonest and most successful means of propagating an invention. That the leader should be expert in the mode which he propagates is not at all necessary. By publishing his approval of it Henry Ford could probably advance the practice of seed selection as much as do all the experiment stations of the country together.

It has long been recognized that the thing or process itself is the best breeder of demand and use of it. McCormick sent out operators with his reapers to 'demonstrate' to farmers the need for them. The early typewriter concerns installed typewriters free in busy offices in order that business men might learn to want them. Not long since an agricultural school had only to exist to be furnished with cream separators of several 'makes.' Morse again and again 'proved' to half unwilling railway 'executives' their need for the telegraph, with their reluctant 'permission' and at his own expense. The process of tradition is often as clearly controlled a process of inheritance as is the breeding of pedigreed cattle; the mode of control is education.

5. Economic evolution, wherever studied in detail, reveals the presence of the learning process and its products — the act and product of invention (the social variation and the social variant); the act and effect of sanction (social selecting and social selection); the act and product of tradition (social inheritance and social heritage). Since learning is the essence of the process vocational education may surely play an effective part in it.

Now we do not know the cosmic purpose of socio-economic evolution, nor what in absolute truth are the lines of 'progress.' We do know that the vocations and economic organization of tomorrow will not be those of today; they may be better,

they may be worse, but they will not be the same. It is possible for us to conceive of the individual as more efficient and happier in economic service than he is now; of the institutions of production, and of economic society as more effective media of life and service than now they are. A better producer, a better vocation, a better economic organization, we can conceive as possible. So to participate in the evolutionary process that the future shall not be worse and may be better is both a reasonable and a Christian undertaking for educators. We have no greater task.

SUMMARY ABSTRACT

1. The process through which productive processes, economic standards, vocations, concerns, and industries come into being, spread, and wax or wane — that is, the evolution of economic society — appears to parallel the process of biologic evolution as traced in the phylogeny of plants and animals, and to be governed by factors similar in the principle of their incidence on the process. What the biologist calls *variation* is matched by the sociologist with *innovation* or *invention*; so *selection* is matched by *sanction*; and *inheritance* by *tradition*.

2. The essence of *invention* is in "using old things in new ways." But the "old things" are in the main things learned, and the "new way" of using them is itself an activity of learning.

3. The term *sanction* includes the approval, toleration, or disapproval of an innovation or invention. But the attitudes and acts of individuals and groups, whereby they approve, tolerate, or reject the new, are obviously learned in the great majority of cases.

4. The prime accepted function of education in the minds of the many is the spread or dissemination of knowledge of what is new or what has long been known. But this is the passing over from individual to individual and group to group and from generation to generation of customs, standards, ideals, etc. or *tradition*.

5. It follows, then, that the processes of change and growth in economic society are in some measure amenable to education, and that vocational education may play a part in facilitating the attainment of democratic ideals in economic life.

CHAPTER VII

CONSEQUENCES OF DIVISION OF LABOR

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. What gains have been made by splitting the vocation of shoemaker into more than a hundred jobs performed by different individuals few of whom can make a pair of shoes?

2. Suppose that in 1832 the light in a lawyer's office went out or the room grew chilly. What, probably, did he do about it? Suppose the same things to happen in 1932. What is the lawyer likely to do about it?

3. If a blacksmith in 1832 broke the hinge on the door of his shop what was he likely to do about it? If a garage repair shop suffers a broken door hinge today what is the owner likely to do about it?

4. Suppose that you need a new suit that fits and need it in a hurry. Would you seek a large clothing store or a small one?

5. Suppose an honest and skilled plumber in Chicago is called upon to devise and install in two weeks' time the most efficient and convenient possible bath and water system for a new dwelling. Suppose again that he has moved to Peaville, the county seat of Lone County, and receives the same sort of call for a new dwelling there. In which case is he likely to do the better job? Why?

6. What kind of skilled man-process preceded the invention of the linotype machine? The cash register? The cotton gin? The compressed air drill? In what ways did such skilled work contribute to the coming of the machine which wholly or partly took its place?

7. What new vocations arose from the invention of the typewriter?

8. What is the chief industry of Gloucester, Massachusetts? Why? Of Redlands, California? Why? Of Akron, Ohio? Why? Of Manchester, New Hampshire? Why? Why are there more lawyers in Cook County, Illinois, than in Vermilion County?

9. What kinds of vocations are suggested by the following: Chicago South Side? 'The roaring forties,' New York? Fleet St., London? Latin Quarter, Paris? Wilhelmstrasse, Berlin?

10. If your neck measures fifteen and thirteen sixteenths inches, what size collar do you wear? How many pairs of socks can you buy with what you save by accepting a sixteen shirt instead of having one made to fit exactly?

CHARACTERISTICS OF ECONOMIC SOCIETY

1. The structure of modern economic civilization is a result of the division of labor in production. But division of labor is a process that finds its impulse in the needs of the individual. For a thousand generations men have increasingly divided their labor and have on the whole found it profitable to do so. The profit lies in two directions: First in the saving of time that it effects; and second, in the increased range of utilities that it makes available for human uses. Now saving of time is from the point of view of society not necessarily a gain, for society is in no ordinary sense mortal. It has 'all the time in the world' at its disposal. But the motive power of society resides in the individual constituents of its organization, for whom, each of them, society is but a medium of life. These individuals have, each of them, but a limited time to live in this world. For each individual the sum and distribution of his activities during the few years that are his make up life. Hence his interest in what we call the saving of time is vital. To save time from one sort of activity for use in other activities is, in general, to increase, if not by any means to insure, the possibility of realizing the best that is in him. Again, to find accessible an increasing range of utilities to meet his wants is, in general, to enlarge his resources for service and happiness. Accordingly men have not only found rational explanations for the accidental and *laissez-faire* divisions in labor, but have become more and more given to reasoned planning for the forwarding of the process. Specialization among men in production, though initiated in biologic differences of abilities and needs between the sexes, is not a process wholly blind.

Specialization in production does save time in several ways. The first is, in general, by reducing the range of activities necessary to production on the part of any one man. To use one tool instead of ten is to eliminate the movements required to reach and restore to place nine tools. But the saving of

time is not in eliminating movements only. Shift of attention from one operation to another consumes time. By cutting out nine of ten shifts of attention in the production of a given utility specialization frees time for other uses. If that time or part of it be used in repeating the one process there results increased speed and accuracy — a time saving both in process and in avoidance of the need for rectifying errors. Thus a particular commodity or service may be produced in less time per unit of quantity or greater quantity per unit of time than without specialization.

The modern slaughter house has taken over the work of the country butcher because it is much more efficient. Its efficiency is due not largely to a substitution of machine for hand process in slaughter, but to a division of butchering processes among many specialists, so that each man meets the same situation over and over again without shift of attention or change of activity, and becomes very expert. Hence a comparison between the work of the country butcher and that of the slaughter house in reducing the live hog to a clean split carcass may serve well to illustrate the gains that come from specialization in production.

Roughly the sequent processes which the country butcher must perform are something like this: (1) He must drive the hog into a corner, (2) slip a noose round his hind leg, (3) drag him to the hoist, (4) throw him, (5) 'stick' him, (6) hoist him to bleed, (7) slip him when dead into a scalding tub, (8) pull him out again and on to a plank or bench, (9) scrape off the bristles, (10) hoist the carcass again, (11) open the carcass from vent to throat, (12) draw out the viscera, (13) spread the carcass and strip out the lard fat, (14) remove the head, (15) split the carcass, (16) drop the carcass and remove the tail, (17) hang the halves to cool. In the course of a busy fall season he may repeat this sequence of processes several hundred times, so that he becomes much more expert than can the farmer who slaughters a few hogs for his own use every autumn. The butcher can undoubtedly in a given number of days slaughter

as many hogs as several farmers assigned to take his place might do and 'make a better job of it' too.

In the abattoir the parallel sequence is approximately this: (1) three or four men do nothing but herd hogs into a corner near the hoisting drum, noose them, and attach them by loops to hoisting hooks. These hooks carry into the slaughter house an unbroken column of up-ended hogs, which pass — sometimes at the rate of six hundred an hour, or more than the butcher slaughters in a season — (2) a 'sticker,' who with a single thrust in the throat of each despatches them. From him the travelling hooks carry the bleeding carcasses slowly down a long passage into a scalding vat whence they are borne to a travelling platform and (3) the scrapers, who with some aid from machine driven tools remove the bristles with almost incredible rapidity. From these specialists the white carcasses move on past several men armed with knives, each of whom (4) makes a particular swift incision through the abdominal wall or the breast bone, as may be his assigned duty. Split from vent to throat the carcasses move next to the care of (5) those who draw out the viscera, then (6) those who strip out the loose lard fat, then to (7) one who with marvelous speed and dexterity cuts out the tails. (8) Next two devote their whole time to severing the heads from the carcasses; (9) another thrusts spreading hooks through the gambrels as the carcasses ride past (10) to two men who with power driven cutters split the carcasses from stern to stern. Swaying majestically as they fall apart the column of 'sides' marches relentlessly on into the dimness of the cooling room, where another group of men (11) shoves each on a trolley to its proper destination.

Thus a travelling chain, a moving platform, two or three power driven tools, and not less than ten men divide the labors on a single carcass performed by the country butcher. Each man has many less movements to make than he; each gives his undivided attention to one process only; each performs the operations of his job as often in a month as the butcher may

perform them in a life time; and each attains in comparatively short time a speed and accuracy in execution that makes him, for the job he does, the equal or superior of the most experienced of butchers. In a day these men together produce many times as many carcasses well dressed as can an equal number of butchers produce of carcasses by no means so well dressed. They might be allowed as many holidays in the week as the inhabitants of Seville are said to enjoy, while the country butchers labored through the non-union day and week of the American farmer, and still hold their own in production of dressed carcasses. Or, put in another way, one thousand men working under the system of the slaughter house can do the work of several thousand under the system of the local butcher, and do it better so far as the product is concerned. A thousand or two thousand men may thus be released for other work than butchering hogs by the superior butchering system. Product per man and per hour of labor is greater and in general of better quality when labor is divided than when the whole job is done by one man.

Repeated practice with undivided attention in any process from wrapping oranges to preaching sermons makes for speed and accuracy. But not all gain due to practice is neural ease of reaction. Hands may become calloused and muscles hardened — that is one reason why the practiced wood chopper can cut more cordwood in a half day than the able and athletic lawyer; fingers may become more pliable — so that the professional pianist can play longer and more delicately than the lady amateur; vocal chords may become more resonant — so that the preacher is more readily heard than the lay deacon and does not grow hoarse so soon; and the like. In the same way tools, like bodily organs may improve with use — for use is on the whole a better conservator than rust or rest. Of course tools may be used up in a shorter time if used a hundred times a day or a thousand instead of a hundred or a thousand times in a year. A hand drill may long outlast a machine drill, but the machine drill in the time it lasts will ordinarily produce

many more bored holes than will the hand drill in the time it lasts. So that per unit of time used the often used tool is more productive than the tool infrequently used. Again practice by increasing accuracy makes for the saving of materials. The skilled machine tender, mechanic, or carpenter wastes much less material than the unskilled, because he makes fewer errors. By and large, then, the constant use of capital under division of labor makes for the saving of time.

2. That increased quantity and range of utilities can be produced under division of labor is obvious. If nine men are required to do what ten men did before it is clear either that more of the same product can be produced, or that the same amount can be produced and at least one new product in addition. If one man can do what five did before, then two men can double the supply of the utility, and the other three can add one, two, three, or even more utilities of a different sort to the world's supply. Not only are more utilities of one kind made available through division of labor than without it, but also more kinds of utilities. Specialization in production by individuals means diversification of production among individuals. By virtue of specialization in production we have available per man today a greater quantity of utilities necessary to sustain life than when production was less specialized, and a greater quantity of those which help to make life worth sustaining.

Diversity of production enlarges the opportunities of the individual in two ways: It increases the possibility and the probability of his finding utilities appropriate to his wants as a consumer; it enlarges the range of vocations among which he may find work appropriate to his particular qualifications, physical and mental. The vocation for which a man is particularly fit and which is particularly fit for him is more likely to exist in a diversified than in a simple state of economic society. From the angle of society, too, diversification offers the advantage that the state has increased opportunity to place in his proper field the man who may serve it well. Given by nature

an enormously differentiated lot of human pegs the greater the assortment of holes the greater the opportunity to fit peg and hole.

Because, as has been pointed out, no individual can specialize except he be able to trust to others to satisfy many of his needs, diversity implies an interdependence among the divers specialists in production. The fact of such interdependence is so obvious to every thoughtful man that further illustration of it need hardly be offered. Like specialization and diversity interdependence is a characteristic of economic society which must be recognized by education.

3. One other feature of modern economic society results from division of labor in production. That is the fact of segregation of economic institutions. It presents, perhaps, more difficult problems for education than any other. This is the age of machinery. Machines are results as well as causes of the division of labor. When a hand process has been so simplified, or even a complex mental process so often used, that it is perfected as habit, then it becomes possible for the worker or another to observe and analyze the essentials of that process. If those elements can be coordinated mechanically sooner or later the machine will follow and displace the hand process or the mind process. In turn the machine calls for makers and operators so that new division of labor is consequent upon its use.

Thus machines now stamp out heels for shoes or stamp out nails, doing the work formerly done with knife and hammer by hand; machines cut and bind and thresh our wheat, doing the work of scythe and cradle and flail once wielded by hand; machines add and subtract and multiply and divide for us — doing the work of the 'mind' of the bookkeeper and the compiler of statistics. But the heel die-stamp, the nail stamp, the grain binder, the thresher, and the adding machine must each be built, so that men now work as specialists in producing them or parts of them. Men must operate the stamping machines, the grain binders, the threshers, and the adding machines.

Indeed the new division of labor often goes far beyond the substitution of a machine maker and a machine operator for the hand or mental process worker. To make the machine, perhaps, calls for new tools and new machines. Those tools and machines again call for other tools and machines to make them, and so on. Each machine so brought into use calls in turn for a maker and an operator, so that a concern or industry new to the world may arise by virtue of the substitution of a machine for a human process of production. Machine shops make machines for machine shops which make machines for making shoe machinery. A whole series of new machine part makers and machine operators is precedent to the assembling of an adding machine and its use by an accountant.

Now machines require power; they require materials accessible in large quantities; they are costly and often ponderous. It is less costly to move men to machines than to move machines to men. Hence we find 'plants' and factories located with reference to accessible power and appropriate materials, and vocations, concerns, and industries segregated in regions, in towns, in cities, and in particular districts or streets of cities. Nor is it the managers and operatives in material production only who follow the machines. The segregation of service vocations follows — for the surgeon must go where his patients are, the lawyer where his clients are, the barber and the merchant where their customers are, the actor where his audience may be found.

Even initially segregation is not always a matter of access to material resources or power. Accident or individual initiative may lead to the location of a new undertaking not according to natural resources conspicuously favorable to its development. The growth of technical resources and traditions of skill or local pride may work to segregation of whole industries in the absence of original selective causes or long after such have ceased to be operative.

The segregation of the vocations of the steel industry in such regions as the Pennsylvania coal and iron fields is a clear case

of direct access to natural resources in materials. The development of carborundum making in the neighborhood of Niagara Falls is a clear case of direct access to power. The location of steel mills along the southern shores of Lake Erie is due to technical resources developed in transportation between the ore beds of the Lake Superior region on the one side and the coal fields on the other. The location of the textile and shoe industries in New England was originally a matter of access to power for machines, but is maintained by traditions of good repute and skill. The development of the automobile industry in and around Detroit, if not altogether an accident, certainly was not based upon any inherent superiority of that region over many others for the purpose. But the growth of technical resources and, perhaps, also the tradition of skill now makes the region one of unquestionably superior resource and opportunity for vocations in the motor car industry. Hollywood has much clear sunlight and a long season of mild weather. Inherently it has no superiority over many another location for the making of motion pictures. But again the development of technical resources and traditions of skill has become a factor making for the segregation of a particular group of concerns and vocations, if not an entire industry.

Geographic regions are not the only centres for the production of particular groups of vocations. We have shoe towns, clock towns, brass towns, toy towns, type-writer towns, plow towns, powder towns, railway equipment towns, and so on, and so on. Within towns and cities also are gathered together vocations of directly intercontributory relation with one another, concerns mutually interdependent, whole industries, in certain sections or streets. Everybody knows what Wall Street means. The stock-yards district of Chicago, the water-front of Boston, the produce market district of Baltimore, the clothing district of New York, the wool district of Boston, are familiar examples of segregation within cities. In a certain block of the wholesale district may be found only those who contribute to the distribution of plumbing fixtures and plumbers' supplies. In

another every house bears the shingle of one or more physicians. A whole row of city blocks may be given over to publishing houses; another to the studios of artists and sculptors. Of late we find buildings, even, constructed to meet the needs of a single profession, so that, for example, the lawyer's office has lawyers to right of it, lawyers to left of it, lawyers in front of it, as well as above and below and behind. One who has chosen a certain vocation may thereby have destined himself to work in a certain street of a certain city for the major part of his life.

4. Conditioning any effective specialization in production either by individuals or groups is a potential or effective demand for utilities of the particular kind to which the specialization may be devoted. Specialization in shoe manufacture is predicated upon a demand for shoes; specialization in cutting heels upon a demand for heels; specialization in stamping nails upon a demand for nails. But beyond this few processes can be standardized to the extent of machine use unless demand exists for a standard product. Division of hand processes among workers may well occur in the custom shoemaker's shop where every customer demands a shoe to fit his or her particular foot. But no shoe factory can be built in the face of such an individualized demand. Many men have feet which will fit fairly comfortably into a number eight shoe, but few men who wear number eights are exactly fitted. Their feet vary about the number eight standard, some longer, some shorter, some broader, some narrower, some fatter, some thinner, and so on. If each man insisted upon an exact size very few soles and uppers could be cut to exactly the same pattern. But as soon as the large number of men who can get on a pair of number eights in comfort and with satisfaction to the eye are willing to accept that size machines can profitably be built and operated for the making of the parts of number eights. Now approximate satisfaction of a particular want is enough for most people, since it is possible by accepting standard utilities to satisfy a number of wants approximately at the price

of satisfying one exactly. A man whose foot demands an eight and a quarter shoe can buy a standard eight or eight and a half and a hat and a shirt and a pair of gloves for the price of an exact fit for his shoes. Because many people have wants approximately the same and are willing to accept and pay for a product that 'will do' for any one of them if not the best for any one of them, standardization of products and the efficiency in quantity output that comes from the use of machines are possible.

On the whole standardization enlarges the opportunities of the individual by permitting him to satisfy more of his needs than could be satisfied by insistence upon an individual adjustment to him in particular. But the trend to standardization inflicts hardships upon particular individuals here and there. A man who needs for a certain construction job nails of eight and a half penny length must use either eight penny or nine penny nails. The size he wants is not to be had except through the expenditure of much money and loss of time. Any man, rich or poor, whose feet demand a number four or a number fourteen shoe or a number five or number eight hat is a patron of the custom shoemaker or the custom hatter. Where individual differences in need for the same kind of utility are great standardization of the final product is not possible and standardization of process to a machine basis cannot go far. No machine for the removal of gallstones is in prospect despite the large demand for their removal among middle aged and well fed people.

A return to the individualized and particularized demands of the renaissance period might have some artistic advantages, but it would mean a vast reduction in the range of utilities available to the uses of the run of men. The real evils of standardization lie in its possible effects upon the producer of the standard utility rather than in the effects upon the consumer of it, for any loss that he suffers in the meeting of one particular is, in most cases, more than made up by the increased total of satisfactions in consumption which diversified

specialization in the production of standardized utilities makes possible for him.

Division of labor, then, has given to modern economic society the features of specialization, diversification, interdependence, segregation, and standardization in production. These features for good and evil are results of the evolutionary process impelled by the mortal urge to make the fullest use of the time in which each of us may live. They must be recognized and dealt with by education for they are not to be abolished by any fiat of man.

SUMMARY ABSTRACT

1. Specialization in production is the prime characteristic of economic society. The impulse to specialization is found in the needs of the short lived and much demanding individual to make effective use of the time that is his. Specialization does save time and enlarge the resources of consumption:

- a. by eliminating time consuming activities on the part of the producer;
- b. by eliminating time consuming shifts of attention on the part of the producer;
- c. by increasing through habituation the speed and accuracy of productive processes;
- d. by increasing the time unit efficiency of tools, implements, machines, powers, and materials in production.

2. Specialization in production of one utility by individuals or groups implies:

- a. economic interdependence between individual and individual, and group and group;
- b. diversity of production among individuals and groups;
which in turn imply:
 - c. enlarged range of choice among vocations for the individual according to his aptitudes;
 - d. a possible adjustment of particular abilities to particular requirements in production, or a superior organic efficiency in the state.

3. Specialization has led to the use of machines, which in turn make for further division of labor. The use of machines is a factor in the segregation of vocations, concerns, and industries, because in general machines

must be located with reference to accessible power and materials, which are unequally distributed. Inequality of distribution is not always 'natural,' but may be due to other than geographic factors, such as accumulation of technical resources based originally upon accident or individual initiative and maintained through tradition of skill in the segregated groups. Producers of commodities gather about machines, and producers of services follow their customers. Segregation of vocations, concerns, and industries, despite many consequences socially undesirable, is a feature of economic society that must be reckoned with as an established fact.

4. Large scale specialization — i.e. specialization in the case of power machinery — is based upon standardization of demand for utilities. The individual here and there suffers through such standardization of products. But as a rule acceptance by the consumer of a product approximate to his individual requirements rather than exact implies a distinct enlargement of the purchasing power of his income. For the price of one exactly suitable utility he may secure several different utilities sufficiently appropriate to satisfy him. In that sense the extension of his consuming range compensates for deficiencies in particular fulfillment of a given want.

CHAPTER VIII

CONSEQUENCES OF DIVISION OF LABOR

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Does the housewife of today, in a lifetime, use a greater or less share of her time in economic production than the housewife of 1832? The surgeon of today than the general practitioner of 1850? The bricklayer of today than the mason of 1850? What demands upon the leisure time of these specialists exist today that did not exist for the workers of an earlier day?

2. In what respects are the amount, distribution, and environment of leisure likely to differ for the dairy farmer and the dentist? The stenographer and the trained nurse? The high school principal and the hard-ware drummer?

3. What people furnish the market for polo ponies? If a dictator should decree that all men and women should work twelve hours a day three hundred days in the year what would be the probable effect upon the circulation of the Saturday Evening Post? Why is the market for ostrich plumes subject to enormous fluctuations?

4. Suppose you were called upon to analyze and record the sequence of movements you go through in dressing yourself in the morning how would you find out what they were?

5. A farmer milking a cow can carry on a conversation about the political situation in Washington. Does his ability to do so intelligently diminish the longer he continues to milk his own cows and the more skillful he becomes as a milker?

6. A woman runs a sewing machine for hours to make clothes for her first baby. Does she regard doing so as drudgery? When is running a sewing machine drudgery?

7. The 'drifter' represents the most intelligent and most highly educated type of laborer in industry. What do you say?

8. Merchants of men's clothing sometimes complain that Henry Ford has hurt their business. How?

9. Division of labor in making shoes is said to facilitate the allocation of responsibility to individual workers, but to lessen the sense of responsibility of the workers to the wearer of the shoe. Can both these conclusions be true?

10. What persons most conspicuously oppose a high tariff on wood pulp? What persons most conspicuously favor it?

11. With whom does an army officer most frequently come in contact in his working hours? In his leisure hours? A college professor? A coal miner? A dairy farmer? A lumber jack?

12. Manufacturers often wreak great injustice by holding back inventions. Manufacturers often wreak great injustice by introducing inventions. What do you say?

13. Casting back over these questions what suggestions, if any, do you find for vocational education?

PROBLEMS FOR VOCATIONAL EDUCATION

1. For rather more than a century emphasis in education has been placed upon preparation for leisure—that is for life's activities outside the domain of vocation. Because of this emphasis two charges have been laid against education:

1. Education has been so far dominated by consideration of leisure that it has neglected to care for the needs of vocation. Millions have been educated for a leisure which they could never enjoy because of lack of proper vocational qualifications.

2. The content of education for leisure has been derived largely from a past and a foreign conception of the nature of the demands of leisure. That content was presumably reasonably appropriate to the needs of a courtier of the later Middle Ages or possibly to those of an early Victorian 'gentleman of the old school,' but it is utterly and absurdly inadequate to the needs of the normal man or woman in an American democracy of the twentieth century. It has been suggested that the pendulum of emphasis must swing far in the other direction before a rational adjustment to the needs of modern life is achieved by our schools and colleges.

In these charges is enough of truth to make the facing of them by educators wholesome. The second charge in particular presents a challenge. We can only accept or deny the first. But the second we can do something about. If education designs to prepare for life, then, it must recognize the realities of life. Nevertheless, if education has been somewhat one

sided, it has been right in recognizing the immeasurable significance of leisure in life. A child is no more born fit to use his leisure for his own good and that of his fellows than he is born fit to choose and pursue serviceably and happily a vocation. Incidental experience is no more fit to solve the problems of use of leisure than it is to solve those of vocation. Hence the call for education to be more effective in qualifying the citizens of democracy for useful and happy leisure than ever it has been presents one of the great demands of modern times. Failure to meet it successfully means the ultimate failure of democratic civilization.

It cannot be said with indisputable accuracy that the increase in productive efficiency which has come from specialization has been accompanied by proportionate increase in leisure. We know that the run of individuals engage in a range of activities of economic production both relatively and absolutely more restricted than that of their ancestors of fifty, or a hundred, or five hundred years ago. But there is no reason to suppose that the total range of life activities beyond the merely vegetative has greatly decreased. If the average man has become in one particular specialized it does not follow that he is in total less active mentally and physically than under a social régime which made greater demands upon his versatility in economic affairs than now is the case. The logic of subtraction, rather, indicates that the ratio of economic to total activities has not increased. The extraordinary development of variety in utilities implies clearly that most of us are considerably more versatile as consumers than were our forbears. It seems a fair conclusion then, that in an objective sense, at least, non-economic activities play a larger part in everyday life than they did in a day when in externals, at any rate, the consumer's environment was simpler. It is not proved, but it is reasonable to conclude, that leisure activities have in general increased with specialization.

It seems probable, too, that in general we have more time free from the demands of productive pursuits than formerly.

In those pursuits which engage the majority of civilized human beings — pursuits of agriculture, manufactures, commerce, transportation, mining and the extractive industries — the average producer devotes fewer hours in the day, and relatively fewer days in a longer lifetime, if not in a given year of life, to economic production than did his grandfather and great grandfather. The time which he can give, and perhaps must give, to activities outside his vocation has in the total increased.

The conclusion that for the many, leisure has increased, does not carry the corollary that the proportion of the uselessly non-productive — the scum and the sediment of civilization, sometimes called the cream and the dregs of society — has increased. There are no statistics to prove that the 'idle rich' are relatively more numerous than they were in the Middle Ages or among the Greeks and Romans at the peak of their national culture. Despite so-called 'crime waves' it is more than doubtful that the class of criminals gains upon society. The insane and the defective are preserved, and, perhaps, even propagated as once they were not and could not be. But the pauper and the beggar are by all tokens less common in a civilization of 'industrial democracy' than they were in a civilization of feudal and monarchical regimentation. If the world continues to go, as it has always been going, to the dogs, it is not because men give less of their time to production than in the 'better days.' With an increase and wider distribution of leisure among men has come an increase and wider distribution of economic service among men. The greater the diversity of opportunity in vocations, the greater is the probability that a larger proportion of the population will find service in one or another of them. The totally unfit in a restricted régime of industry may often find a place in one of widely diversified industry.

An increase of leisure may or may not be significant. Leisure may refer to activity or to absence of activity — to the activities of the worried pleasure seeker who labors to fill his hours with tennis, golf, motoring, and 'bridge' in order that

he may not perish of *ennui*; to the lack of activity of the ragged hobo sleeping content like a lizard on the sunny side of a railway embankment. It may refer, as implied in our discussion above, to the time one has 'off the job,' or to 'what one does when he doesn't have to work.' An increase in 'time off' has, in itself, no particular significance for good or evil. It is neither blessing nor curse. But the activities of men in 'time off' are enormously significant, both to the individual who 'uses the time' and to society. If they are good greater leisure is a blessing; if they are bad greater leisure is a curse. Which they shall be education may very largely determine.

The major phases of the problem of education in leisure do not enter in a discussion of vocational education. But the bearings of vocation upon leisure and of leisure upon vocation are sufficiently pertinent to justify a pointing out of some of their implications for education. It is obvious that vocation conditions the amount and distribution of leisure time for the individual, and often the environment of his leisure. The physician, the iron puddler, the stenographer, the sea captain, and the farmer, have normally neither the same amount, the same distribution, nor the same environment of leisure. Thus in guidance of the individual to fields of greatest opportunity vocational education must take cognizance of the limitations of leisure that go with a vocation. On the other hand, leisure functions largely to the creation of economic wants and so determines the environment and scope of vocations. The demands for certain furs and for certain books and magazines are demands almost purely consequent upon leisure, but they condition industries and the vocations of thousands of men in the 'fur trade' and clothing industry, and in the news and publishing 'trades.' The development of worthy wants or ideals and standards of leisure that condition favorably the efficiency and happiness of those who in vocation produce utilities to meet them is a function of democratic education. Knowledge of the demands for the products which are consumed in leisure is obviously to be imparted by vocational education.

Knowledge of the sources of such utilities is a part of the education of the consumer. Knowledge of the inter-relations of every particular leisure demand with the welfare of the producer implies too large a content for education in leisure to deal with, but with general and serious effects upon welfare it can deal. Knowledge of the effect of demand upon the producer's welfare is, of course, a part of vocational education. It can also deal with general serious effects of product upon consumer. There is a field for education here difficult to define but of great significance to social integrity and economic progress.

2. It seems to us not at all remarkable, but altogether fortunate that our pulse and our breathing go on while we work or play or dream. The beating of the heart and the movements of respiration are 'reflex' — examples of the manner in which the bodily machine runs itself. The machine engages none of our attention and only rarely are we aware at all that it is running. Nature, by making many important features of behavior automatic, sets us free to do many things consciously, and if we think at all about the fact we recognize that this automaticity in important matters is a basis and condition of all mental growth. If we stop to think about it, too, we see that learning also makes, or can make, many activities automatic to very nearly the extent of the heart beat. That fact also, in spite of the horror of mere mechanic habits sometimes expressed by educators, is a very fortunate thing. It is as much a condition of intellectual and æsthetic development as is nature's direct provision.

Most of us have known girls, perhaps, who can chew gum, dance, and carry on a conversation at the same time. The chewing and dancing and some of the conversation also appear to be no more dependent on conscious direction than are the heart beat and the breathing, which undoubtedly go on along with them. The chewing, dancing, and chattering mechanisms seem to run themselves. But the girl was not born that way. Rather she has perfected habits of chewing, dancing, and light

chatter to such a degree that they are virtually governed from the backbone rather than from the brain. She does not have to think about them at all, and doesn't. With most of us the complex art of handwriting has reached the same stage, — the stage of automatic habit. We can be thankful for that if we have any hope of writing what is worth reading.

Repeated 'response to the same situation' leads to the perfection of habit that leaves us more and more free to attend to other things while the habit mechanism performs. In vocations of routine character meeting the same situation over and over again is the essential objective feature of activity. So, too, it is in the routine parts of any vocation no matter how large in scope. The heel cutter, the candy packer, the template driller and the pig sticker become automatic in the movements of production, or virtually so; likewise does the housewife in the wiping of dishes daily in the midst of varied duties; likewise does the farmer milking in the cow barn and the banker signing checks. Some of us in most of our economic activity and all of us in part of it can 'carry on' with a minimum of conscious attention. We cannot leave the job bodily, but we can and do somewhat depart from it mentally. We are on the spiritual side at leisure on the job. The nature of this quasi-leisure is of significance to us individually and may be of importance to others.

If our mental freedom be given to desirings out of harmony with our physical bondage then the work we do becomes drudgery. If the candy packer is longing to be at the movies while she packs package after package her job becomes a tedious chore; if the banker yearns for the golf links while he signs check after check the routine becomes 'distinctly bore-some,' and he is likely to seek a substitute to 'save the valuable time of an executive.' If our mental freedom be given to activities of a sort not inimical to the routine affair in hand, then the process becomes a matter at least tolerable and indifferent to us. If the pig sticker whistles the Blue Danube and day dreams of the days of his childhood while he thrusts

and wipes and strokes the whetting steel then the sticking proceeds not painfully to the sticker. If the dishwasher thinks of the new car that the family is to have next week the dishwashing is not a present distress. On the other hand if the content of our quasi-leisure is not merely compatible with the routine process, but cognate and harmonious with it, the process may be consciously satisfying. As one well known dairyman has put it: "If the milker sees in the cow the foster mother of mankind and not a machine for making milk, then milking ceases to be a penalty and becomes a privilege." A mere job to one man may be a ministry of service to another.

In routine mechanic process all of us find satisfaction at times without looking behind, into, or ahead of that process. In itself, like chewing gum, the mere activity satisfies or is even pleasurable. In certain of us the capacity to enjoy routine is large, in others the limits of that capacity are soon reached. But nearly all of us must sometimes, — and many of us most of the time, — go far beyond sensation and the gratification of habit to find anything of the calling aspect in the routine mechanics of productive activity. It is a fair generalization that the more we understand and appreciate — that is, the more we are able to place intellectual and æsthetic values upon what we do — the more likely we are to find what we do worth while in itself. In other words the greater the fund of congruous associations we have with a perfected habit the richer is our experience in the use of that habit. Love of a routine job is seldom a blind love.

The significance to others of the quasi-leisure that accompanies the perfection of habits in routine processes of production lies in the fact that such quasi-leisure may function, and sometimes does function, as leisure does. It may lead to discovery and invention by which the routine process is modified and improved or a machine substitute is found. The mechanic who has perfected his skill in an operation to the point that it no longer demands all his attention is free to observe and

study that process both from the point of view of effectiveness in production and from that of safety, comfort, and satisfaction for the conductor of the process. That he often does so is indicated, probably, by the fact already noted, that most of the minor and many of the major process improvements that are of record in the patent offices have been made by skilled process operatives. No amount of leisure would have sufficed to many such inventions in the absence of sufficient quasi-leisure on the job to give the worker the feel of it in whole and in part as no spectator can feel it, nor any man whose whole attention is absorbed in the mechanic act itself. By the same token, too, freed attention may create demands for improvement by those who are not themselves inventors. That it does so there is no doubt. Improvements are probably as often forced upon employers by operatives as forced upon operatives at the behest of employers. Last and not least in significance to society is the fact that the man who finds a calling in his routine is the man who sticks to his job. That obviates the necessity of 'breaking in a new hand,' who, for the time being at least is less efficient, and does away with the waste of time and capital involved in replacement of the operative — a waste that is reflected in diminution of quantity or quality of product. Happiness in routine work among routine workers is correlate with efficiency in service

3. Somewhat unjustly vocations in which routine plays a large part have been characterized as 'deadening vocations.' Process repetitions create a mental vacuum which they do not themselves fill, but they do not at all necessarily lessen the capacity of mental responsiveness. Neither inertness nor discontent is a sequitur of relative automatization. The vacuum may be filled, by education, appropriately to the satisfaction of the worker; it may be filled inappropriately, with a result in discontent; or it may remain relatively a vacuum. It appears, then, that education faces two problems here: 1. To guide into routine vocations those who find satisfaction in routine, and to guide away from them those who find

routine intolerable. 2. To fill the vacuum created by routine with congruous and satisfying mental content.

It is more or less a tradition from feudal days that ignorance, or the maintenance of the vacuum, is the best guarantee of individual content and social stability in routine vocations. The great danger, we hear, of 'too much education' is that it will deprive us of the 'hewers of wood and drawers of water' who are so necessary to social welfare. But ignorance of the sheeplike kind is as impossible as it is undesirable in a democratic society. And the fact remains that the relatively ignorant or stupid are not, on the whole, more content in routine than the well informed and intelligent. The employment of the benighted and low grade immigrant in simple machine tending processes has resulted in an increase rather than a decrease of 'labor turnover' in factory industries. Mr. Crowell reports a case of much significance. In a Detroit factory a process department was afflicted with enormous 'turnover.' Ignorant men of a low mean of intelligence did the work and did it well, but they would not 'stay with it.' The larger the pay the sooner did they abandon the job to seek another. Then someone had an inspiration. He brought in a group of intelligent mechanics, sufficiently informed and skilled to build the machines about which the trouble centered. After careful explanation of the importance of the process to the factory organization he asked them to undertake the operation of the machines. A number were willing to do so; and they proved no better operators than the men they displaced. But they did 'stick.' Because they understood the machine, the process, and the value of the product, most of them found the job tolerable or even likeable. In other words recognition of the subjective aspect of vocation solved the problem. The vacuum was filled with appropriate vocational meaning.

Mr. Arthur Pound in his book, "The Iron Man," has placed a finger on the potency for evil in the relative automatization that has come about in many vocations through division of labor to extreme specialization in simple repetitions.

Snedden and others have pointed out that he exaggerates both the tedium of machine tending and the extent of machine tending in industry. Attention, they say, is more fully engaged than is apparent to the observer, and the number of those who engage in simple machine tending is but a minor fraction of our workers. Granting the validity of the criticism there is yet little doubt to an observer of evolutionary trends in production that Mr. Pound is right as to the possible effect of simplification upon the producer.

Mr. Pound's remedy, however, appears questionable. He would find it in the glorification of the pay check. Through extended "cultural" education he would make leisure so meaningful that the machine tender, fixing his eye upon the prospect of delights in leisure shall gladly endure the day and the week of otherwise meaningless labor. The dark vacuum that is the by-product of routine is to be filled with light, not from the job, but from the refulgent orb of leisure. The window through which filters that comforting light is the weekly envelope.

One may have entire sympathy with increased effort in education for leisure, and yet doubt that it is the sole and proper source of 'sweetness and light' in such a case. *The problem in routine occupations is not to get the job done, but to make the job worth doing for the man whose job it is.* A sufficiently glorified pay check may make any job worth enduring. Understanding, insight, emotional appreciation — such only will make a particular job a calling for a particular man. If heel cutting, nut setting, candy wrapping, template drilling, and the like appear 'utterly without rational or emotional content' that is a reflection upon education rather than upon the 'deadening pursuits' themselves. Law, medicine, teaching — the professions — furnish the worker with rich resources of thought and appreciation. Mechanized process pursuits call upon education to furnish them with resources of the kind. If education cannot do so, the poverty lies in education and not in process repetition.

Reading large meanings into simple things is one great function of education. What stories are simpler than the parables of Jesus; what stories carry greater human significance. The background of screw setting and roof painting in scientific and social implications is sufficient to large meanings in such occupations. Education which is designed to give objective or material results only may be good education in a socialistic state wherein the individual is of value merely as a cog in the social machine; but in a democracy, where the life of the individual is of value in itself, it is bad education. A man who is a good productive mechanism, but not an understanding and appreciative producer, is no more a member of the democratic state than the machine he tends. Economic activity is not only a means to civilization; it is an integral and essential part of the living of civilized men.

4. Interdependence between vocation and vocation, concern and concern, industry and industry, is, as we have seen, both a result and a condition of division of labor, or diversified specialization in production of exchangeable utilities. The whole economic system of the world is already so bound in mutual dependence of parts that the failure of a steamship to arrive on a given date or the strike of a group of skilled men in any part of the world may throw thousands out of employment who are unaware of the existence of steamship or strikers. The utter dependence of each of us and each group of us for opportunity to serve upon the willingness or ability of others to serve is only too vividly brought home by failures in the 'key industries,' as in coal strikes, railroad embargoes, or 'shut-downs' in steel plants. The ravages of the sheep destroying parrot in Australia and New Zealand limit the development of industry in Massachusetts and affect the vocations of modistes in Paris. It has been argued that the Mexican boll weevil has been a blessing to the South. The dollar income has not decreased, despite the ruin of thousands of farmers, and 'diversified farming,' which in the degree that it is successful must force many Northern farmers into urban industries, has

come in to preserve the fertility of the soil. But an increased price and a forced readjustment do not save one pound of the cotton that the boll weevil has destroyed, or produce one of the thousands of utilities in which a hundred industries are deficient because of the shortage of cotton. Particular individuals, concerns, and industries, may benefit in a pecuniary sense from such unavoidable breakdowns in production, just as hotels may profit by destructive fires in a residence district, bus lines from a railroad wreck, or physicians, undertakers, and florists from an epidemic of influenza. The world loses no money, but the world is poorer in the resources of production and consumption.

Over many failures of individuals and groups man has but a limited control. Earthquake, flood, fire, disease, he has not yet mastered. Nor has he mastered himself as the need for mastery increases with mutual dependence. For mutual dependence implies mutual responsibility. The more one depends upon others for the right to use and produce, the greater becomes his duty to use and produce dependably.

There is undeniable truth in the trite statement that the chain which binds together the units of our economic civilization is no stronger than its weakest link. Within concerns and industries the weakness is already recognized. We hear a great deal about the 'attitude of the employee,' *esprit de corps*, and 'company loyalty' as factors in intra-industrial organization and integrity. The importance of coöperation and of the need 'that employer and employee get together' is stressed at every conference of the 'big men' in industry, in all sorts of 'business publications' and trade journals, and in the weekly and daily newspaper press. Nevertheless, in today's paper of a great metropolis it is news of first page and full column importance that the employers and employees of a city traction monopoly have recognized in their coöperative agreement an obligation to the travelling public of the city fully equal to that which they owe each other. In the same paper the editor praises warmly our national government because it has deter-

mined to keep hands off and let the coal industry "settle its own problems." (To wit, whether or no coal shall be produced in sufficient supply for the winter.) Not long since a highly intelligent employing engineer gave voice to a disquisition upon the ideals that the university should set before its engineering graduates. Among other things he said: "There is one that they seem not to get — that the engineer has one paramount responsibility, the responsibility to show a profit for the concern which employs him. If he cannot do that he is out of place in the engineering profession." Again, the editor of the New York Times takes Mr. Ford to task for "smug talk about service." He insists that profit is and must be the proper and dominant aim of all business endeavor; that service is sometimes, and often may be, a useful means to the end of profit, but that it is a means only. This is the common as well as the "common sense" view of the matter. It is really very seldom that profit is recognized as a means to the end of industrial service, or as a factor that conditions service. Vocational responsibility that extends beyond the producing group in which the individual plays a part is rarely emphasized in speeches from the lips of industrial captains or of 'labor leaders.' It is, perhaps, in actuality not so rare as the speakers make it appear by their neglect of it, but it is rare enough. Yet the integrity of our economic civilization is bound up in the responsibility of the individual producer, the concern, and the industry for the welfare of those whose economic and leisure activities lie outside the zone of their immediate associations.

We must grant at the start that no operative, manager, entrepreneur, or 'professional man' is at all likely to develop a sense of responsibility to those who depend upon the service he renders, unless he knows of their dependence. But the assumption, often made, that knowledge of others' dependence must result in growth of the cooperative spirit will hardly hold. Indeed we are well aware that knowledge of the dependence of others may be an asset in 'industrial warfare' and in business competition quite as truly as in military warfare. Employers

and employees, and 'rising business men' alike, have used it as ruthlessly and as effectively as the Germans used the submarine. If the ideal of success in economic pursuits is to extract 'all the traffic will bear,' then, obviously knowledge of how much the traffic can be made to bear is a business asset. If the dependent is so far dependent that he can be made to accept shoes with paper soles or coal that is mixed with slate or butter that is reinforced with slaughter house waste, then operative and manager whose loyalty is loyalty only to the concern which employs them, whose responsibility is only to show a profit, can in perfect sincerity and without a twinge of conscience demonstrate their loyalty and responsibility by adulterating the shoes, the coal, or the butter. To restrict production, to shunt aside inventions, to use shoddy materials, to give the least that we can 'get by with' may often be 'good business' so long as industry, and concern, and individual producer regard the problems of production as "their own problems." But, of course, they cannot do 'good business' of the sort unless they know just how far the dependent can be forced.

Knowledge of the facts of interdependence has not always been used for the benefit of the many; too often it has been used for the benefit of the few. But that is not at all evidence for the belief that the sense of duty has died, or even that 'the ethics of business' has deteriorated with the growth of interdependent specializations in production. Plain honesty is probably more prevalent in the business world than at any time in history. But honesty is measured by standards of a code that grew up in days when mutual dependence was far less than now it is — when the effects of individual and group disservice were far less widespread than now, when a failure here and there affected but a few. *Caveat emptor* and all that it stands for is not a wholly empty phrase today, but it is by no means the governing principle that once it was. Probably a majority of producers, at least in the mercantile and professional classes, would refute its validity. The minority grows smaller, but the view and action of a minority are perhaps

more significant to the welfare of the many in an age of interdependence than was the practice of a majority in an age of relative self-sufficiency among individuals in economic affairs. Honest and responsible service is more common than ever it has been, but dishonest and irresponsible service is far more important than ever it has been.

A suggestion of the spirit of the times in economic affairs is given in the common phrase, that 'business is a game.' Our college graduates go into the 'bond game,' the 'insurance game,' the 'automobile game,' and so on. The 'business game' is an honest game on the whole, but it is so because in the long run the honest man wins at the game. The essence of the game is to win, to 'get all you can' without violating the rules. It is still the rather noteworthy exception in which a young man enters upon his vocation as a civic obligation to responsible participation in cooperative service. Yet interdependent specialization in production more and more exigently demands that every man should so regard his vocation. Under a philosophy which makes of vocation a means of winning a living or better from the other fellow the linkages of economic civilization grow tenuous while the strain upon them increases.

Interdependence, then, as a feature of economic organization implies an attitude and a habit of responsibility for every producer that looks beyond the immediate conditions of his job. It implies conformity to a code more far reaching than that which governs the play of one team competing with another. But men are not endowed by nature with such an attitude and habit nor has society by any *laissez-faire* evolution arrived surely at such a code. By learning only can the changes be brought about. Since the incidental experiences of everyday economic activity have obviously proved insufficient to accomplish such changes education for the purpose becomes a necessity. Interdependence of individuals and groups makes it possible for us to conceive of the individual as a more responsible producer than he now is, and of the ethics of business as better than they now are. Thus a conscious participation in

economic evolution through vocational education appears possible. Further features of economic organization point to the belief that it is desirable.

The fact that a 'corporation is soulless' has sometimes been blamed for the failure of business ethics to keep pace with the evolution of economic interdependence. But logic hardly points to that conclusion. Indeed the fact that the corporation has possibilities of life far beyond those of the individual makes for persistence of the long run policy of responsibility. The good name of a concern is by the same token more of an asset than the good name of an individual. As the concern may become much older than any individual the development and influence of a tradition of responsibility may well be greater than in the case of the individual. Few individuals are to be relied on so unquestionably as are many of our 'old business houses' for rendering a responsible service. But in such concerns the trend is to allocation of responsibility to the managing few, and full service is maintained by close selection and supervision of process operatives. The shift of ownership to stockholders rather than owning managers has, however, made the maintenance of the spirit of responsibility by imitation and contact difficult at best. Few hired managers can or do personify the concern as did the old fashioned 'head of the firm' who knew and dealt with all his employees first hand.

5. There can be little doubt that the trend of division of labor toward process rather than product vocations robs 'experience on the job' of some of its incidental effectiveness in developing the attitude and habit of responsibility. Millions complete nothing recognizable in the way of a product. To cut a hog's tail from the carcass, to turn up a nut on a chassis, to drill a hole in a sheet of iron, to throw coal into a furnace, to feed metal into a press, to operate the levers of a hoist at signal — each of these is to add economic value to a final product, to produce then and there a utility for the next worker. But just what he has produced the process performer cannot say. The process by which he performs a step in production has in

itself nothing of individuality. It is standardized — just exactly what many others are doing. The producer who cannot see what he has produced cannot feel as his the process of production. Again millions who produce a recognizable product produce one in no sense recognizable as *their product*. The product is standardized — just like any of a thousand others produced by any of a score or a thousand other workers at the 'same job.' The heel cutter in the factory produces a heel or a slice for a heel. It is perfectly plain to him that he is 'getting something done.' But he cannot go to the shipping room and pick up a pair of shoes which show 'his work.' Very few of the Ford factory operatives can point to a given 'flivver' standing in the long lines at the curb and say with confidence even this: "I helped make that machine." Standardization has robbed much of production, both as process and as product, of all individuality. The artisan of older days did not always own his work, but he knew the work that was his. The modern process repeater at his machine neither owns nor knows the product of his skill.

The man or woman whose productive activity is but an incident in the upbuilding of some finally consumable product has been thrust back a long way out of touch with the consumer. There is little in the sewing on of button after button, or in the glueing of heel after heel to bring to the operative a sense of responsibility to the wearer of the shirt or the shoe. Yet he and all his friends and acquaintances wear shirts, all of which have buttons, and shoes, all of which have heels. He is a wearer of shirts and shoes rather than a user of shirt buttons or shoe heels, in his own thinking, but in his work he is a sewer of buttons or a gluer of heels. Often, too, the process operative is out of touch with the taker of the next step in production of the product to which he contributes. Sole leather is finished in one town, but heels are cut from it in another; button holes are finished in one room and the buttons which fit them are sewed on in another. Process is isolated from process and product from product and producer from producer. In the

experience of the producer there is little to reveal the continuity of the total process of production or the wholeness and unity of the final product.

The contrast between the work of the old time shoemaker and that of the modern shoe operative is marked in that respect. The old time shoemaker made the shoe 'from hide to wearer.' Every part was his work and the whole was his work; every part of the pair of shoes and the shoes as a whole carried recognizably, to him at least, the stamp of his individuality. Then, too, he dealt directly with a customer whose particular wants he must know and satisfy. Completeness, individuality, and consideration of the consumer were all involved immediately in the production of a pair of shoes. In the very act of producing them the shoemaker learned something of the responsibility of the producer.

There are still many vocations, of course, in which the producing act and the mores of the producing group serve to maintain the sense of responsibility at a high pitch. The highest attribute of the medical and teaching professions, for example, or of our police and firemen is manifest sense of responsibility to others. The attribute is most conspicuous in vocations of which the product is complete, the service obviously significant, or the consumer directly dealt with — in a word vocations in which standardization of process or product is not yet a marked feature. Nevertheless, even in medicine and teaching a trend to 'passing the buck' is sometimes observable. I have had the experience, not absolutely unique, of seeking the services of seven successive physicians, each of them presumably capable of giving the help needed, before finding one who accepted as proper to his province the treatment of a broken finger. Many a patient suffers through inaction while an accessory consultant is called in, not of necessity, but for the sake of professional courtesy in recognizing his specialty. Let an investigator try to 'run down' a fault of discipline in a large modern high school and he will soon discover that teachers, like express company agents, are not

unlikely to dodge responsibility and pass it on to another. A policemen's strike is unique, but individual policemen and individual firemen, of course, occasionally manifest the very human trait of escaping difficulties by the plausible excuse that a particular duty belongs to another specialist.

Largely because failure to assume responsibility as the need for it grows under division of labor is so common we find that industry complains of a vast 'overhead cost' in supervision of workers and inspection of products. The same social fact is at the base of those clamorous appeals for government intervention or government control whenever a serious breakdown occurs. It is, too, behind the mass of regulatory laws and ordinances concerning labor and the products of labor. Pure food laws, pure seed laws, factory commissions, public utility commissions, and the like are necessary in the degree that individual and corporate lack of responsibility in production are common. But law and coercion are only expedients. They do not get at the root of the difficulty. We cannot, even were it desirable, revert to an artisan economy. The ultimate remedy — if ultimate remedy there is — and the certain amelioration of the condition lies in education. A proper ideal of aim for vocational education is the responsibility of every producer in every vocation to all who depend upon him directly or indirectly.

6. Man cannot create a Pennsylvania, a 'corn belt,' a Niagara, or a Hudson æstuary when and where he will. 'Natural resources' are limited and unequal in their distribution. It is inevitable under division of labor, then, that certain industries should be segregated from other industries, concerns from other concerns, and vocations from other vocations. But if man cannot control the amount and location of 'natural resources' he can, within rather wide limits, control the amount and distribution of technical and human resources of production. If he cannot distribute coal fields he can distribute coal. The mine and the miners must be where the coal is or the iron is, but the machine shop and its workers need not be at the

mine or even next the foundry. Building, industrial, and labor regulations can be effective and sometimes are so. Cities and towns can be, and sometimes are, intelligently located and laid out. Segregation as a factor in economic organization is in some measure amenable to social control. If there be evils in the segregation of producers from one another education — the chief and final measure of effective social control — can do something about it.

Segregation of producing groups about geographic centers of 'natural resources' has been, of course, conditioned — and even stimulated — by improved modes of transport and communication, modes which man largely, and not nature solely, has created. In the Northeastern and the Southern States beds of marsh ores are widely distributed. In early days nearly every considerable community in those states had its 'iron works.' Only the development of railroads and steamship lines made possible the centralization of the iron industry about the richer beds of ore in Pennsylvania and Michigan. The same factors contributed to regional segregation in apple growing, wheat growing, flour milling, and scores of other types of production formerly widely distributed.

On the other hand improved transport and communication may make for wider distribution of vocations. Good roads and the motor truck appear to have given impetus to decentralization in certain fields of manufacture and merchandizing. Industrial and commercial extension appear now to keep pace with the growth of great cities or even to outpace it. Factories and stores appear more and more frequently in small towns where formerly their survival was economically impossible. In New England small industrial towns are increasing in number and prosperity while the metropolis grows at a relatively slow pace. Industries, concerns, and vocations that ten or twenty years ago were distinctly localized are becoming more widely distributed.

A trend of the sort appears promising from the standpoint of democracy. It promises to lessen some of the evils which

result from close segregation of producing groups. For such segregation, though in the main advantageous in terms of productive efficiency, does entail risks to the integrity of the state and limitations upon the individual. The social bond between individual and individual, group and group, is based upon the sharing of common experiences and common interests. Upon mutual awareness of these things are built tolerance, sympathy, and the coöperative spirit. We must have a common denominator in life to bring us together. The larger that denominator the more are we united in the "consciousness of kind." Two strangers who meet and attempt to strike up an acquaintance always begin by seeking to find a common basis of experience and interest. That is the reason why the weather is so prevalent a topic for the initiation of conversation. Everybody shares experience of the weather. However divergently they may express the idea sociologists agree that the bases of human intercourse are to be found in awareness of likeness in experience and interest.

When vocations are few and much of a type vocation furnishes an important factor in the common denominator of experience and interest for the many. 'How is business?' among city men, and 'How are crops in your neighborhood?' among country men still initiate the approach to understanding of those who are relatively strangers to one another. When every man was a farmer and a soldier the vocational factor in social solidarity was potent. But with diversity in specialization the sharing of common vocational experiences and interests among the many becomes less and less, until, as now, the features of life likeness between corporation lawyer and coal miner, banker and farmer, teacher and shoe laster, are not obvious. If to the primary divisions and differences in so large a field of life as vocation there be added a segregation through most of the waking hours of those whose experiences and interests differ, then the bases of fellow feeling between men are still further weakened. The vocational factor threatens to become potent for disintegration.

Attaching a man to a desk, a bench, or a machine immediately lessens the range of his social contacts. If at neighboring desks, or benches, or machines there are those whose vocational activities and aims are much the same as his, then the possibility of formation of bonds of intercourse and sympathy with others of diverging experience and interest is much limited. Now segregation of industries, concerns, and vocations does bring about just such a condition. It goes further. By bringing workers of a kind together in centers it limits also the variety of contacts in leisure.

Association of the like-minded is, of course, a means to efficiency and happiness. But when it leads to a narrow exclusiveness either in the associations of vocation or of leisure it is fraught with danger to the integrity of the state. The small group, most of whose experiences and interests are mutually shared by the members, becomes closely knit. Other groups and their members become 'outsiders.' A fellow shoe laster is likely to mean more to the shoe laster than a fellow shoe operative, and a fellow operative than a fellow member of the concern, such as the manager of the factory. With his fellow operatives and even with the superintendent his sympathy is likely to be stronger than with a Wall Street broker or a Kansas farmer. Indeed, with such as they, his consciousness of difference is more potent than his "consciousness of kind." A merchant cleaves to a fellow merchant as he does not to the dentist or the high school principal or the milkman. He is likely to shun, if not to feel a positive antipathy toward the college teacher of Philosophy because he feels that he has so 'little in common with birds of that kind.' On the whole the influence of segregation is distinctly to strengthen the bonds of the individual to the small group at the expense of his sympathies with the larger. It promotes clannishness and economic provincialism in the largest and most significant field of civic obligation — vocation. Because it affects so many it is a far more socially dangerous feature in civilization than are the snobbishly exclusive clubs and cliques of leisure groups.

Recent events would seem to disprove any apprehension that such an effect from vocational segregation is the mere vain imagining of a doctrinaire theorist. Even when the supreme common interest of the great war seemed to have united us as a people more closely than we had been united in a generation many individuals and groups devoted their economic energies to exploitation of the necessities of their fellow men. The 'bloc' and the lobby, which are still with us, point again to the superior strength of bonds to the small group as against the large. Just as world civilization may be threatened by excessive nationalism, so a nation may be threatened by undue loyalty to a particular group within it. If the bond to vocation, concern, or industry be stronger than the bond to country, then the weaker bond will break first. The history of the past forty years shows that too often it does so. Instances of loyalty to the smaller group as against the larger are innumerable, ranging from the strife of 'organized labor' with 'organized capital' through intra-labor-union and intra-corporate conflicts, to the cliques and cabals of departmental groups in universities and the petty snobberies of medical men of different 'schools' in their dealings with one another and the laity.

Men grow in mind and body through reaction to the environment in which they live. Here and there, of course, an individual may develop to the full his most useful capacities for service and happiness within an environment little varied and affording social contacts only with those of his ilk. It is, nevertheless, a safe generalization that the greater the variety and amplitude of environment, physical and social, the richer is opportunity for development of a full and satisfying life. Men do not grow beyond narrowness who spend their lives within the same four walls each day and among the same small group of kindred workers. Segregation certainly does not tend, for the run of men, to enlarge opportunities for physical, intellectual, æsthetic and moral growth. In a world the resources of which are becoming constantly more rich and varied any trend to

isolation of such resources from one another is unfortunate from the point of view of self-realization for the individual.

It is hard to conceive of an environment more drab and unstimulating than that of the factory districts of certain cities or the mining villages of certain rich industrial regions. Nothing is there but the bare means to efficient production of the particular utility, coal, iron, hides, cotton cloth, pork and beef, or what not, as the case may be. The mediæval world was incomparably less rich than ours in resources of things, of men, and of ideas, but the mediæval village street was a much richer environment for growth through the incidental experience of daily living than is the street of many an industrial village or city district of today. And the relative poverty of environmental resources is a direct consequence of segregation in production.

In the state segregation makes for variety of activities, or at least does not interfere with increase of diversity; for the individual it makes toward limitation of environmental resources. Variation with stability is the evolutionary process in society and the growth process in the individual. Segregation makes against stability in the social process and against variation for the individual. To foster stability in the state and variety in the individual becomes, then, a problem of educators, because of economic segregation. Like the other features of economic organization it points to new demands upon education.

Educators have been by no means deaf to all these demands. In general they recognize particularly the responsibility of education for social integration, and in theory at least, have accepted the larger categories of social responsibility which organization of present civilization throws upon them. College presidents and school administrators are wont to proclaim at public meetings that the evils of a material age must be overcome by education. They hold, and rightly, that men must know and sympathize with one another as men in a degree superior to their recognition of fellowship with one another as

participants in the same vocation, concern, or industry. But in the main schools and colleges have organized to establish the common bonds and enlarge the resources of human growth in terms of a common leisure and a 'common citizenship' set altogether apart from vocation. Very largely they have treated the economic activities of life as unfortunate, but necessary evils, and have set themselves to compensate humanity for the burden which such necessity has thrust upon it. They have sought the bonds of integration in a common language, a common school and playground experience, a common knowledge and reverent attitude towards the great figures and events of history, particularly that of the American people, and in worship of a common God; they have sought resources of intellectual and æsthetic growth in literature and art and science kept pure from the taint of economic utility. And all these are worthy and powerful resources for promotion of social integrity and individual growth. But the fact remains that they have in the main ignored the fundamental experience and implicit interest which we all share as producers of economic utilities, as a further means to social integrity; that they have ignored the resources of vocation as calling — a further means to the enrichment of the individual's life. Every man and woman in a genuine social membership is a producer and a relatively continuous producer of economic service of some sort, whether in the ditch, at the bench, behind the plow, at the desk, or in the kitchen — an experience and interest less likely to be dimmed than those of youth in the classroom or on the school grounds. Any man may find in the implications of his vocation resources for growth that are as satisfying as any of leisure can be, and complementary to his chief social service rather than supplementary to it. Education should make explicit the common bond of productive experience and interest in service; it should bring into the foreground of consciousness the implicit significances of vocation. Doing these things it becomes vocational education, and works at the points of weakness.

7. In any long view of economic evolution the invention of new processes, machines, and standards of product is a condition of improved efficiency of the economic state and increased well-being among its members. But in a brief view of the evolutionary process invention appears not always to forward the welfare of society. Often an invention which in the long run is surely a blessing may, if taken up at once into the economic process, check for the time being efficiency in production and prove disastrous to the happiness of individuals and groups. Check in efficiency there must be during the interval in which a new process is learned, or a new machine installed, or an old standard product disposed of. Loss of efficiency is a minor evil soon compensated. In general, too, law and custom make easy the transition from old to new by affording protection from great loss in discard of old machines and old goods, if not in discard of old habits. Since the life of a machine is short and the turn-over of standard products is rapid a ready compromise can be made between the needs of the present and those of the future. On the human side, however, compromise is more difficult. A man whose chief asset in economic competence is skill or knowledge acquired through years of experience may find his job suddenly wiped out by the substitution for it of a simple and easily acquired process, a machine which does the work, or by acceptance of a new standard in the product. In a recent article in the *Atlantic Monthly* an arbitrator of disputes in the clothing industry points out very cogently the difficulty of justice in such cases. The established principle is that the needs of society in the large take precedence over those of any group of possessors of capital or possessors of particular skill and knowledge of productive worth. It requires inevitably that genuine improvements in production must be adopted sooner or later. Just how far and how long the state should forego the advantage of an improvement in order to palliate the misfortunes of the producing group is not easily to be determined. The degree of significance for human welfare that the improvement surely

promises is, of course, the major factor in arriving at a judgment in any given case. Few would dispute the proposition that if an improved mode in the treatment of cancer or tuberculosis is discovered it should be adopted with the utmost speed — no matter what its effect may be upon the practice of established physicians, instrument makers, patent medicine manufacturers, or cemetery associations. But if an improved mode of pressing trousers (see article mentioned above) is found, then, society is obligated to put up with less than the optimum creasing until such time as the clothes pressers have been able to adjust themselves to changing conditions. It is probably more important that cancer sufferers should be relieved from suffering or saved than that physicians should continue in the way to which they have been accustomed or keep their incomes up to the usual standard. It is probably less important that the number of suits pressed per week should be doubled than that a considerable group of men should be forced to cast aside their chief asset in the maintenance of themselves and their families. It appears at present that the best title to protection in times of transition is the ownership of property. Machine and product take precedence of the worker. But the worker, if he belong to a strong group, has recourse both in law and in custom, sometimes at least. The consumer has no guarantee. He must wait until industry sees fit to produce by the new method.

Education can do this at least — it can affect the factors of sanction and tradition of inventions so that each is guided by an intelligent recognition of conflicting demands between the few and the many, the present and the future. Vocational education should contribute to the growth of open-minded justice in economic affairs.

SUMMARY-ABSTRACT

1. Increasing division of labor in production makes, on the whole, for an increasingly wide distribution and an increasing sum total of leisure time among men. It makes also for increase in the interdependence of men in leisure and for increase in the range of utilities available for use in leisure time — that is an increase in both the exigency and the diversity of demands upon the leisure time of the individual. Probably leisure occupies today a relatively larger share of the individual's life than it did under a régime of less specialization. Accordingly, education in the use of leisure becomes not less but more than ever significant both for the individual and for society.

Vocation conditions both the amount and the character of leisure opportunity. Leisure conditions both the character and the progress of vocation. Vocation and leisure are so closely bound together that neither education in leisure nor vocational education can neglect responsibilities with respect to the inter-relationships. It is not true, as has been said, that vocational education and education in leisure are exclusive and independent categories of education.

2. The perfecting of certain habits to a level of quasi-automatic response is a condition of mental freedom and growth. Repetitive routine in productive processes tends to develop technical habits to such a level. By so doing it creates a sort of 'leisure on the job' which is, or may be, a very significant factor in the life of the producer and in the dynamics of economic institutions and society. How that quasi-leisure shall be used depends largely upon education — and vocational education has an important function to fulfill in that respect.

3. To characterize repetitive pursuits as 'deadening' is inaccurate. Process repeating may create a relative mental vacuum which in itself it does not fill. But that fact implies no lessening of mental capacity or necessary reduction of mental alertness. Routine may be in itself satisfying or dissatisfying according to the character of the individual who follows it. It may become satisfying because of the content of the mind of the worker or become dissatisfying by the same token. Vocational education has two functions here:

- a. To guide into routine pursuits those who have aptitudes for satisfaction in routine, and away from them those who have not.
- b. To develop a congruous and satisfying mind content to fill the vacuum concomitant with the perfecting of habits in routine processes — i.e. to make the job in itself worth doing.

Neither ignorance nor compensation in superior rewards in leisure is a remedy for the dangers of automatization. The man at his job is not a

machine, but a man alive. Vocational education should contribute to his satisfaction in the job, not from it only.

4. So much has interdependence between producers and between producers and consumers become a condition of specialization that a producing individual or group may be very seriously affected by failures in production or consumption among those who are remote from him or it in space or time. Failures among producers due to inefficiency or to lack of the sense of responsibility present a challenge to vocational education. Its function, however, consists not in a diffusion of knowledge of general and particular interdependencies only, but also in a development of personal standards and group ethics of responsibility in service.

5. Standardization in productive processes, along with segregation of ownership of products, has done much to lessen the effectiveness of mere job experience as a developer of the identification of the worker with that which he does and makes. Vocational education must make up the deficiency.

6. Segregation of vocations, 'concerns,' and industries makes for the formation of narrow interest groups and for limitation of the contacts of the worker with those outside his peculiar field of interest. Hence it carries with it dangers both of social disintegration and of individual restriction of growth. Segregation in terms of geographic distribution of resources must be accepted as a necessity. Segregation, however, in terms of technical and human resources may be lessened or done away with by education. In all vocations are involved bonds of service and responsibility which are common to all producers. Vocational education should contribute to the diminution of unnecessary segregation and to the development of "consciousness of kind" among all workers.

7. Changes through the introduction of economic innovations make in the long run for the welfare of society. But sudden changes often inflict hardship or injustice upon individuals and groups. There is no established criterion of justice in such cases whereby the conflicting demands of the few and the many, the present and the future, can be reconciled. But vocational education can influence the factors of social sanction and tradition in the process of change, and can contribute to an attitude of liberal open-mindedness and sympathetic justice in economic affairs.

CHAPTER IX

THE NEED FOR VOCATIONAL EDUCATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. What are the chief functions of a system of education in a democratic state? What is a good state from the point of view of democracy?
2. If democracy has developed and is advancing without any general system of vocational education, what ground is there for proposing such a system?
3. List the chief agencies of education in each of the following:
 - a. The Babylonian and Egyptian era of greatness.
 - b. The 'classic age' of Greece and Rome.
 - c. The Middle Ages.
 - d. The Renaissance and Reformation.
 - e. The colonial days of America.
 - f. The early days of the United States.
 - g. The present day in France, England, Germany, the United States.

Which of these agencies in each period performed a function of specific education? Of vocational education?

4. Suppose a custom shoemaker in a city where he has a dozen competitors takes on a half dozen apprentices. What obligations does he owe to those apprentices? What obligations does he owe to his customers? How should he organize the work in the shop to meet his obligations to the apprentices? How should he organize it to meet his obligations to his customers? To meet competition?

5. Why does not law or custom require that a template driller, or a candy wrapper, or a nut setter shall take out papers and serve an apprenticeship with a master of the craft?

6. Why has the custom of preparing for the bar by reading law in a lawyer's office, while serving as his 'handy man,' given way to preparation through the law school?

7. In what ways is the every day experience of a young man in Cedar Rapids likely to help him to determine whether or not for his own good and that of society he should become an iron puddler? A mining engineer? A naval architect? A forester? A dairy farmer? A locomotive engineer? An orange grower? A publisher? An undertaker?

8. Stand on a street corner and count the number of adults, stranger to you, whom you can identify by vocation, among the first hundred who pass.

9. Would you expect to get accurate information about the work of a metropolitan city editor from a press feeder in the employ of a metropolitan daily?

10. A city man bought a farm next to that of a very efficient farmer. He observed regularly and carefully what his neighbor did and followed his example in every detail as nearly and as promptly as he could do so. In telling of his experience he said: "Almost every time his crops did better than mine and his stock did better than mine, and every year he did a better business on a farm no better than mine." Does this seem to you a likely occurrence? Why?

THE INADEQUACY OF A 'PICK-UP' SYSTEM

1. Whatever aims education may have for the betterment of the economic state it must deal always with the individual. The state as such cannot be educated. Education should enable the individual to choose wisely and with least suffering or waste that mode of life in which he can serve most worthily, effectively, and happily; it should enable him to enter upon and pursue his chosen mode with qualifications appropriate to fullest service and satisfaction in it. Thus it appears reasonable that education should establish and follow through two programs: (1) A program of guidance to vocation and to preparation for it. (2) A program of preparation in the several worthy vocations of the state.

2. Such a proposal may appear rational, but that it does so is not proof of the necessity for adopting it. For after all education is only a measure of social economy whereby loss of time and the mistakes of unguided learning may be avoided. There are other ways in which men may learn and society progress. A man may 'pick up' what he needs in the way of points of view, knowledge, and skill necessary to choice of vocation and the successful pursuit of it as an incident to his contacts with economic life. In fact most of us adults who follow vocations with greater or less success owe our choice

so far as it has been a choice, and owe much of the proficiency and satisfaction that we may possess in vocation to what we have learned in such fashion. Again the individual may gain much that is useful in choice of vocation and in pursuit of it from education designed to ends quite other than vocational. Most of us have found, for example, the command of written English and of the arithmetical processes very far from useless in choosing and following our vocations, despite the fact that we were taught them with, perhaps, no purpose in the mind of any one to serve in such fashion.

Now resources of economic contact and participation appear to be very abundant in present day civilization. Certainly resources for 'general education' are more abundant and accessible than ever before in the history of the world. With such resources democracy has made real progress, industry has become increasingly productive, and the mass of mankind is by no certain measure less happy than it has been for five thousand years at least. If education is to undertake such programs the need for them must be shown.

3. In part at least society has long recognized this need. Among the first of vocations to which division of labor gave birth were those of teaching. In embryonic form they appear in the institution of apprenticeship which was well established in that 'ancient realm of evil things,' Babylon. In more primitive stages of social evolution the sachem, the warrior, and the priest became teachers. Moreover they taught vocations — the ways of their several crafts. In the days of ripened and fruitful Athens the gymnasium and the lyceum prepared men for entry into a specific mode of life in which vocation was included. Sparta taught vocation in its education for citizenship. The schools of the Sophists for rhetors, grammarians, and orators were avowedly vocational schools. Even in the 'ages of darkness' the most conspicuous schools were those for the priesthood. Those treatises of the Middle Ages which most influenced the trend of education dealt with the specific and vocational preparation of the prince and the

courtier. The institution of chivalry itself, with its pages, squires, and belted knights, was but a glorified apprenticeship to the vocation of gentleman warrior. The mediæval universities were apprentice schools to the vocations of *doctor* or teacher in philosophy, theology, or finally medicine. The successive 'degrees' but parallel the steps of apprentice, journeyman, and master which marked the progress of the artisan in the admirable system of vocational education provided by the mediæval guilds. Luther himself, who is credited with giving to education its first powerful impulse toward free and unspecialized schools, was, perhaps, as much interested in discovering and preparing protestant ministers to fight the papacy as in developing uncontrolled individual interpretation of the Scriptures. Certainly he was not greatly pleased with the success of pupils of his schools in making interpretations different from his own.

Europe had established schools of military art and science and of engineering before the real history of American civilization began. In America the first schools after the Jesuit teachings among the Indians were of the classes and specifically preparatory. Harvard College was founded to prepare a particular ministry to a particular gospel. Thousands of our young women today are pursuing in the name of chaste and liberal culture a curriculum largely that designed to prepare the Congregational minister of a century gone to follow his vocation. The constitutions of our first states required that every parent should bring his children up to 'an honest trade' — and government first provided the opportunities for so doing in prisons and reformatories. Franklin and Oberlin were notable proponents of the idea of vocational education for those who by birth or fortune were not privileged to find it in existing schools and colleges. Through their efforts small beginnings in schools for printers and other craftsmen were established. The states next took a hand in setting up normal schools for the vocations of teaching, and federal government established colleges for military and naval officers and promoted

the development of colleges of agriculture and the mechanic arts in the several states.

But in the provision of vocational schools of 'sub-professional' grade private agencies took the initiative, notably in organizing and maintaining schools for commercial employees. Certain organized industries and labor bodies followed suit with the establishment of 'trade schools' for employees or members. Cities came next in the support of technical and industrial schools and of vocational courses in high schools. Less than twenty-five years ago the states entered upon the promotion of vocational schools of secondary grade. The passage of the Federal Act for Vocational Education in 1917 gave a tremendous impetus to the movement, and we now have the beginnings of a widespread and diversified system of vocational education designed to prepare boys and girls and men and women as efficient workers in vocations of agriculture, household economy, industrial manufacture, and commerce. Vocational education having as its aim productive efficiency rather than vocational appreciation, and as its function preparation rather than guidance is definitely established in America and growing rapidly.

4. Meanwhile the earliest type of vocational preparation has pretty much broken down. The number of vocations to which apprenticeship opens the door is relatively to the total range of vocations far less than it was fifty or a thousand years ago. The reasons are not far to seek. For apprenticeship is a dual purpose institution. The master is both a teacher and a director of productive workers. The aims are both educative and economic; and the two functions that the master performs are not fully harmonious under a competitive economic régime.

Consider, for example, the case of the master draper and his apprentices. As a teacher his success lay in turning back to his trade young men of understanding skill in the artisanship of designing, cutting, and fitting cloaks, gowns, and suits. As a draper his success lay in producing the most valuable possible surplus of well designed and manufactured cloaks,

gowns, and suits. But, both as teacher and as draper, he must recognize the fact that his apprentice-employees, being human, varied in their aptitudes. To achieve his purpose as teacher he must provide for each boy practice at every one of the several processes of the trade for a time sufficient, at least, to attainment of the standard proficiency of the journeyman. But one boy learned to design, or to cut, or to fit, promptly and with few mistakes; another learned slowly and with much waste of costly goods. Though perhaps a challenge to the teacher the slow or stupid apprentice was a source of loss to the draper. In the economic view, however, the draper must keep down the cost and maintain or improve the quality of his product. To that end common prudence urged the necessity of assigning to every apprentice those processes in which his aptitudes disposed him to a quickly acquired proficiency, and to keep him there. One apprentice might then spend all or most of his time at cutting, another at sewing, another at fitting, and so on. The master was in a dilemma. If he did his full duty as teacher he penalized himself and society as draper; if he did his best work as draper he exploited his pupils and failed in his duty as teacher.

It is no wonder that even in relatively unchanging vocations the discovery was made that good productive organization is not likely to be good teaching organization. That masters should give up the dual rôle to become either producers or teachers of producers was inevitable. The origin of law schools and medical schools, as well as of many types of 'trade schools,' is in considerable measure attributable to the competing interests of masters of apprentices.

Comparatively few of the apprentice-maintaining vocations did, however, remain unchanged. Most of them were split into process jobs each of which was erected into a vocation of itself. The draper's trade has given birth to a score of interdependent vocations in the clothing factory. Out of the wreck of the cobbler's trade have arisen more than a hundred productive pursuits. In medicine the general practitioner gives

way to a dozen assorted specialists. No man is any longer master of the law. Every competent lawyer is a specialist in one or another phase of the law. The work of Abelard and Mark Hopkins is done by departmentalized staffs of 'subject specialists' in universities.

Three, four, and seven years were common periods of indenture among apprentices to the several crafts of former days. To achieve artisanship in the production of completed goods was a matter of long practice and assiduous study. But to master the process of cutting heels with a machine, the setting on of nuts, or even the assembling of the parts of a watch, requires no such period of learning. It is a matter of a few days, a few weeks, or a few months rather than of years; a matter of repetition rather than of reasoned understanding. Given a manufacturer ready to risk a 'fool-proof' machine or a little material with a 'green hand' who asks small wages or no wages at all while learning, apprenticeship is promptly discarded. Between competition and simplification in machine industries it is nearly extinguished as an institution.

Not in all vocations, however, has the length of the preparatory period become shortened. For simplification is, of course, only relative, and the new vocation may come to be even more exacting than that from which it sprang. In medicine the preparation of the specialist requires more time than was formerly required to enter upon general practice. The standard of proficiency has been raised to a great height; the technology of medicine has grown enormously with the development of science. The modern oculist knows but a small part of medicine as compared with his grandfather's mastery of the whole known field; yet the skill he possesses is greater than any his grandfather possessed and the depth and the width of his knowledge are greater also. His period of preparation is necessarily longer than that required of his grandfather. The demand for resources of knowledge and skill such as no single master of medicine can possess is a factor quite as important as the competition between economic and teaching aims in

driving apprenticeship out of medicine. The story of law, teaching, engineering, and other professions is much like that of medicine.

5. This state of affairs seems to indicate an increasing need for vocational education at one end of the scale of vocations and a decreasing need at the other. Vocational education of the type provided by the professional schools appears to be more and more a necessity; that of the type provided by 'trade schools' more and more unnecessary. But the conclusion hardly accords with the facts as they appear. On the whole the simplified mechanic vocations seem to suffer more from lack of competent and satisfied producers than do vocations of professional character. Explanation is to be found in the limitations of the 'pick-up' method of learning.

Assume that 'pick-up' is sufficient to proficiency in an increasing proportion of modern vocations; it is still clear that 'pick-up' can be effective only for those to whom it is accessible. But segregation of industry means that whole groups of vocations are inaccessible to any given person. In two ways segregation operates to prevent access to contact with many vocations: first by location; second by custom and tradition.

Suppose, for example, that one boy in four hundred is capable of his greatest service and happiness in some vocation of the shoe industry. To find a way into that vocation by the 'pick-up' route he must live in or near a 'shoe town.' But hardly more than one boy in four hundred of our population lives in or near a 'shoe town.' The chance of the particular youth for finding his greatest opportunity is exactly one in four hundred. Nor is that the whole story. Grant that the boy lives in a 'shoe town.' On the factory gate is a sign: "No Admittance Except on Business." Industries do not open their doors so that any curious youth may observe and try his hand at the several processes. Incidental contact with the shoe industry will not teach the boy much of value in choice or preparation for his vocation under such circumstances. But he may have contact with 'shoe workers' if not with shoe manufacture.

That is true. Let him have a score of relatives and friends who work in shoe factories and who are willing or desirous to inform him in respect to opportunities in shoe manufacture — an entirely unlikely case. His chance of guidance is still small, his chance of preparation smaller still. For hardly one man among twenty in the shoe industry knows it sufficiently well to be a valuable advisor if he would. The chance that he could teach the boy his chosen vocation is obviously less than one in twenty granting his willingness and access to tools and materials for doing so.

Suppose, however, that through information at second hand the boy determines to try his hand at the laster's job. He is not, in many 'shoe towns,' free to try his hand. The factory management has an agreement with the union to employ only union lasters. But the union admits to membership only competent lasters. Thus with the shoe industry right at his doors, with the capacity and the desire to learn a particular trade in that industry, the boy may run against a blank wall. If he is persistent and courageous and circumstances permit he may leave town to seek a 'scab' factory elsewhere in which the working conditions, the work, and the product are inferior.¹ If 'times are flush' he may find a chance to work at the laster's job and learn it; if not he must pocket his patience or turn to another pursuit.

Now the shoe industry is not so segregate as many others. Both in its management and in its labor organizations it is more liberal and foresighted than many others. It already permits or supports in some places schools for lasters and other skilled employees. But the situation illustrated is not unrepresentative of the limitations of 'pick-up' in discovering and qualifying for a relatively simple factory pursuit.

It may be said, of course, that the burden of proof is not yet shifted, since industry does keep its machines running and workers do find employment. The retort is: That is true only because industry must take what offers, not what is most

¹ See A. D. Dean — *The Worker and the State*.

fit; because youth must take the chance at hand, not that which is best for him and for mankind through him. When industry and the consumer can find no fault with efficiency, when the worker stays with his job because he loves it, only then can a *laissez-faire* system of 'pick-up' be justified, or any system for that matter. At present 'pick-up' seems anything but an adequate means to realization of the democratic ideal of equality of opportunity to serve and to find happiness in service.

The inadequacy of 'pick-up' for preparation in vocations of professional type is generally recognized; but its adequacy for guidance to such vocations as for others is quite as generally assumed. Segregation sets limits to incidental discovery also. To be sure in villages and in the open country some vocations are so open to every day contacts that no boy or girl 'grows up' in total ignorance of the qualifications that they demand or of the opportunities that they offer. In the larger towns and cities such is seldom the case. The physician and the lawyer have offices altogether apart from home and family. Like the 'business man' and the factory hand they are segregated from the mass of their fellows. In our cities are high school boys and girls who can tell no more about 'father's' vocation than that he is a 'doctor,' or is 'in business,' or works for Bloom and Reilly down town. There are thousands who have never seen father at work, and others who at best have had but a glimpse of him sitting in his overalls to receive the hot lunch they have brought him. It is to be added that the father is rare who talks to his children about his work, or who knows enough of the work of others to talk intelligently of it, if he would

Within a circle of brief radius the city includes hundreds or even thousands of vocations. But the city youth in his daily life is shut off from all effectual experience of the greater number of them. 'The hives of industry' are closed, for the most part, to him as an observer and still more so as a participant. He learns something of the work of the school teacher, the

sales clerk, the news vender, the policeman, the taxicab driver, the street sweeper, and a few others as a mere incident to his life in the city. But he is kept out of the factory and the office, 'shooed away' from the construction job, the wharf, the railway yard — most of the centres of productive activity. On the street he mingles with lawyers, stockbrokers, surgeons, actors, artists, manufacturers, mechanics, electricians, plumbers, carpenters, dress-makers, mannequins, button-hole stitchers, ditch diggers, detectives, — a multitudinous and ever changing host of the happy and the unhappy, the efficient and the inefficient in the work of the world. Except, however, for such uniformed workers as the 'cop,' the 'gob,' the fireman, the 'doughboy,' and the 'chef,' they are all to him 'guys' or 'skirts,' men or women, only. What he learns of the work of the world and of its workers is haphazard and exceeding small.

In the rural village and the open country vocations are not so segregated as in the city, but they are relatively few. Those that are most urban in type are least accessible. Many vocations that might serve best for particular boys and girls are not represented at all. But such vocations as are found do admit of incidental learning as those of the city do not. For the customs of the countryside are more favorable to knowing one's neighbor and his business, and to helping him in his business than is the case in the city.

Unguided experience, however, has fundamental weaknesses as a means to learning. Observation is fortuitous; participation is determined by economic demand, not by educative need; the content of experience is conservative and traditional, not creative and progressive. The weakness of 'pick-up' at its best appears in the life of youth on the farm. For though few farms are representative of the best or the worst in home and agricultural vocations, they do, by and large, furnish the most complete incidental education with which the children of our democracy are favored.

For illustration consider the boy on the successful dairy farm.

The dairy farm is the medium of a vocation of fairly wide scope and energizing character; dairy farming is a widely distributed and representative type of the vocations of agriculture. Its activities involve habits and attitudes of mind largely functional in like vocations, and, in somewhat less degree, in many fields of endeavor not of agriculture at all. Such are the following: (1) The habit of assuming responsibility. (2) The habit of planning for results not immediate. (3) The habit of seeing the day's work through in terms of accomplishment and not of hours. If incidental experience is likely to develop such habits anywhere it is on the diversified farm such as the dairy farm.

Good economy on the dairy farm demands that responsibility shall be, finally, at least, in the hands of the operator. Father on a good farm is normally and rightly the 'boss'; his boy is a 'hand' doing what father tells him to do, and not necessarily or often sharing in any conscious way the responsibilities of the farm. So far as he bears responsibility the boy is responsible to his father and not to himself, his employees, or his customers as is the farm operator. In general the incidental experience of upbringing on a dairy farm can be little relied on for developing in the farm boy habits of responsibility such as will serve largely in his future life.

On the dairy farm, again, the work of the boy is to execute in part what father plans, not to make his own plans and carry them out as he will have to do if he chooses any one of many modes of life. What shall be planted and how much, which calves shall be reared and which disposed of and how, what machines shall be bought, etc., it is not for the boy to decide. He shares to a small extent, if any, in the rewards and punishments that come from success or failure in management. Upbringing on a dairy farm, on the whole, does little to develop an essential factor in managerial ability.

For the development of the third habit farm customs and economy are somewhat better adapted. It is a common opinion that farm reared boys are not 'clock watchers.' The boy

on the dairy farm cannot quit milking when the clock strikes or the whistle blows. He cannot pick up half the potatoes and leave the other half to turn green in the sun over Sunday. Very readily he can see the necessity for finishing the job he has started. But after all the cows are not his cows, the milk not his milk, the potatoes not his potatoes in any vital sense. The element of satisfaction which is so potent in the establishment of a habit is not marked. Hence even the habit of seeing the job through is not so certainly or so strongly developed as it might be by education designed to establish it.

In the productive labor of the dairy farm the boy does participate, and he does observe the labor of others. Thus he acquires certain facts and skills that are usable in dairy farming and certain other types of farming. But he seldom gets experience of the whole range of farm work. Good management demands that he shall be assigned and kept to tasks that he can readily master. He milks some of the cows, drives them all to pasture, cleans out the manure, throws down hay, rakes up the tailings, hoes corn, and so on; father drives the corn binder, buys the feed and the fertilizer, sells the young stock, selects the new bull, treats the sick horse, in short does all the jobs that require organized knowledge and superior technical skill. That is good management, but poor education.

I have said that incidental experience is mainly traditional. That is true particularly in the matter of skills. The boy on the farm imitates what his father does, but not his reasons for doing it. That which is subjective, as reasons are, does not appear for imitation. Father says: "We'll start to sow that south forty to oats today," and he and son do it. There is nothing in the seeding process that makes evident why father has chosen oats, the south forty, and today. Farm boys, like other boys, are not incurious and dumb; farm fathers, like other fathers, are not necessarily terse and dictatorial. Father and son are normally friends and given to conversation while working together. But that anything more than an elementary rationalization of standard practices is ordinarily passed on

by such means is very doubtful. The common lack of responsiveness in adaptation to changing conditions by the man who has learned his vocation in 'the university of hard knocks' supports the doubt.

The passing on of the existent standard technique and technology may be sufficient to survival under a stable economic and social environment. But it is insufficient to progress. It tends to a rigid maintenance of the *status quo*, and a relative regression of standards. It makes both for conservatism and for reactionary opposition to change. Individuals who have learned by the imitative method 'get along,' but also fall behind. Change, however, is the law of life. Every environment in which life is a feature, and there is none other, by that fact is bound to be unstable. In the case of the farm boy again, the plants and the animals, the markets and the social organization among which and in which he lives are dynamic. The conditions which he must face on his own farm in the future can never be identical with those his father now faces or has faced. Learning sufficient only to the demands of the immediate present is not enough for the future.

There is a great deal that is known to some practitioners in a vocation which is not known to others in that vocation at all. The trends of variation point to the probable norm of the future, and the normal producer of tomorrow must possess the learning of 'progressive' producers of today, at the least. 'Pick-up' methods cannot give that learning. For example, an increasing proportion of farmers—if still a small one—makes use of some method of cost accounting. The trend indicates unmistakably that the probable norm of farming in the future will demand ability in keeping and using cost accounts. But not one farmer in twenty today could, if he would, teach his son the value, the method, and the interpretation of cost accounts.

At its rare best unguided experience of economic life is non-selective and wasteful as a means to learning; at its abundant worst it is very much a denial of opportunity for happiness to

the individual and of full, coördinated, mutual service among men. Sooner or later democracy must replace it by that guided experience which we call education, or abandon its fervid protestations of belief in equality of opportunity.

Education is not a guarantee of complete equality of opportunity for satisfying service. Unalterable physical, sociological, and psychological forces prevent perfect realization of the ideal. Education cannot redistribute the climates, the ores, the water courses of the earth or even that part of it we call America. Education cannot disestablish the family which brings to the locus of father's or mother's vocation a group of children of varying capacities for service and happiness. Education cannot escape the fundamental law that we can teach only what the resources of teaching permit us to teach. But education can do away with artificial and unnecessary segregation. It can do much to break down the obstacles to learning which custom, tradition, and self-seeking have set in the way of youth. It can direct the experience of youth within the environment of upbringing to ends of useful learning. It can bring resources to youth and youth to resources not available under a system which exploits the future for the sake of the present and lacks altogether a conscious social purpose. A purposeful organization for the discovery of vocation and for preparation in it is needed.

SUMMARY ABSTRACT

1. A democratic system of education should include:
 - a. A program of guidance to vocation and to preparation for it.
 - b. A program of preparation in the several worthy vocations of the state.
2. The general proposition that intelligent choice of vocation-mode according to aptitude is desirable, and that preparation for efficient and appreciative service in vocation is desirable in a democracy, does not carry the corollary that the programs above suggested must be adopted. It is possible that other means than a system of vocational education may accomplish the results desired. It is true that without a system of guidance

to vocation and of preparation for it democracy has already made considerable advances. It has both survived and progressed under *laissez-faire*.

3. Despite the lack of any general program vocational education, as a preparatory measure, at least, is not new. It is one of the oldest forms of education, dating from the earliest records of civilization, and continuing into the present. So far as productive efficiency is concerned society has long recognized the need of specific preparation in certain vocations. Recently, in America a distinct movement has developed for the support and spread of preparatory agencies to the end of increasing efficiency in economic production.

4. In the meantime the earliest form of vocational education — apprenticeship — has pretty much broken down; first, because apprenticeship is a dual purpose institution with conflicting aims and functions; second, because, through division of labor, the character of many vocations has greatly changed, and many have disappeared from the state's economy. In some vocations simplification has made apprenticeship unnecessary as a means to acquirement of proficiency in production; in others elevation of standards and growth of technology have made it inadequate to such acquirement.

5. There are vocations in which incidental 'experience on the job,' or 'pick-up' learning may be sufficient to productive skill. But largely, 'pick-up' learning can be effective only for those to whom it is accessible. Whole groups of vocations, however, may be inaccessible to a given individual because of segregation. The inaccessibility may be due to geographic location, or it may be due to economic or social customs. For one who would 'pick up' his learning of vocation from the worker 'off the job' the latter is an uncertain resource. In the midst of hundreds of vocations the city boy or girl sees much of but a few, and can try his or her hand at fewer still. In the country though access to participation and observation is easier than in the city, the range of vocations in a given community is small. At its best, as on the farm, the value of the 'pick-up' method of learning is distinctly limited; it is non-selective and wasteful as a means to acquirement of vocational efficiency and appreciation; it is traditional and not creative. At its worst, and in general, the *laissez-faire* system is very much a denial of opportunity for discovery of pursuit and calling, and for preparation in a wisely chosen and appropriate mode of economic service. It is also an obstacle to progress in the improvement of the economic state.

CHAPTER X

THE SELECTIVE FUNCTION OF VOCATIONAL EDUCATION

PRIMINARY QUESTIONS AND SUGGESTIONS

1. "All men are created equal." Is this true of weight? Height? Strength? Color of hair? Of any physical character? Is it true of 'reaction time'? Capacity to learn to spell? Capacity to learn the calculus? Capacity for friendliness? Is it true of the environments into which men are born — e.g. of climates? Home surroundings? Language associations? Political organizations? In what sense is it true that "all men are created equal"?

2. It has been found that a boy is rather more likely to enter his father's vocation than any other given vocation? Why? Is every boy born rather more fit to enter his father's vocation than any other? Is the problem suggested one for eugenics or for education?

3. What difference does it make to the state whether a man chooses his vocation wisely or unwisely or falls into it by chance or is forced into it by circumstances so long as he can 'hold down his job' in a satisfactory fashion?

4. If there are three thousand odd vocations in a city what can education do to lay a basis for intelligent choice among them all?

5. What should a boy or girl learn of a given vocation before coming to any decision as to its fitness for him or her or his or her fitness for it?

6. A good textbook should furnish the basis for study of vocations and the opportunities they offer. What do you say?

7. Of what use are 'intelligence tests' or 'achievement tests' in the study of vocations for purposes of intelligent choice?

8. At what age should a study of vocation-modes for purposes of choice begin? What agency should have charge of it? What about the man who is a 'misfit' in his pursuit or calling?

EDUCATION FOR CHOICE OF VOCATION-MODE

"What mortal in the world, if, without inward calling, he take up a trade, an art, or any mode of life, will not feel his situation miserable? But he who is born with aptitude for any occupation finds in the pursuit of it the fairest portion of his being." — GOETHE.

The Apprenticeship of Wilhelm Meister.

1. Men are not born equal. The history of the race and the controlled experiments of science prove, on the contrary, that they differ by nature in physical and mental attributes both in kind and in degree. Nor are men born into equal environments. "Cities of men, and manners, climates, councils, governments" are multifariously diverse. But the doctrine of Jefferson is sound in this: That every man is the equal of his fellows in the duty to serve and in the right to happiness in his service.

It has been said, cynically, that the ideal of democracy is mediocrity. Much in the history of democracy lends color to that view. The revolutionists of France fighting for *égalité* made lack of breeches, and a calloused palm measures of citizenship. The Puritans of the Massachusetts Bay, "seeking freedom in a wilderness," made acceptance of the doctrines of Calvin a criterion of fitness for citizenship. Today, in the name of democracy, cities and states bind their schools to uniformity in curricula, textbooks, and examinations. They compel teachers to the futile effort to raise the incapable to the standard of the capable. According to a view not uncommon education promotes democratic equality among men in the degree that it succeeds in reducing difference to sameness.

Procrustes, however, is not in all quarters accepted as a model. Even the 'one hundred per cent American' finds it democratic to wear shoes that fit a foot not average in size. He is able tolerably to bear up under conditions that allow some men to wear Van Dyke beards, drive Packard motor cars, or vote for Debs, though the 'average American' does none of these things. Less pure but more liberal folk are ready to maintain that education promotes equality of opportunity in the degree that it brings together the variant individual and the variant environment most fit for one another. Education is not concerned with the reduction of irreducible differences, but with interadjustments between them. The attempt to mould men to a pattern is not only wrong, but futile. At any rate, if any human agency, excepting murder, can reduce men

to sameness, that agency is not the school. For pupils under the most pent of teaching develop their traits at different rates and to different strengths, so that inevitably they leave school more unlike to one another in the traits of their likeness than they come to it.

One purpose of education, in such a view, is to lead the individual to discover that 'mode of life' in which he can realize most fully his potentialities for worthy and satisfying service. An omniscient and benevolent 'counsellor' might well select a boy for a job and a job for a boy in the union of which the largest efficiency and happiness would result. But there neither are nor will be counsellors omniscient. It is the work of education to furnish youth with the bases for evaluating vocation with respect to himself, and himself with respect to vocation. His is the right of choice.

The well-being of workers within a profession, trade, business, or industry is bound up with their interrelationships and the integrity of the institution. The efficiency of the vocation or industry as a social unit depends upon the same factors. The carpenter who sets the newel post of a staircase must rely upon the lathe-worker who turned it out; the merchant must rely on his salesmen; the surgeon must rely upon the diagnostician. To the individual, the particular institution, and the state it is important that the right man be in the right place.

Perhaps the most vital problems of the modern state arise in the interadjustment of economic institutions. Certain industries are overdeveloped, others undeveloped; certain vocations are overcrowded, others starved for lack of competent members. Maladjustments and the evils that come from them furnish the substance of the news of the world. The symptoms appear in war, strikes, lockouts, shortages, propaganda, crime. The net results are lessened social efficiency and inequality of opportunity among individuals.

3. Fundamental to the solution of the economic problems of individuals, institutions, and the state itself is intelligent election of vocation-mode. Ideally education should give to

everyone knowledge of all the significant features of all worthy vocations and of himself as related to them severally. In practice, however, education can do no more than to substitute for elements of chance those of choice. Choice involves the deliberate weighing of alternatives, and knowledge of alternatives education can surely give.

4. With every vocation goes, as has been said, a consequent and complementary 'leisure.' These two make up the "mode of life" or vocation-mode. Now within such a mode are certain features, both objective and subjective, which are of relatively great significance. Education, as a short cut to the essentials of experience, must deal with those features.

First among them are the minimum essentials for admission to the vocation-mode. Such are standards of health, physique, attributes of person, mental capacity. If a youth is by nature irremediably disqualified for given modes of service and leisure that is the first significant fact for him to learn. The existence of such minima has already been suggested in allusion to the vocations of dress mannequin, Pullman porter, traffic policeman *et al* in a foregoing chapter.

Second are the major specific abilities necessary to 'carry on' in the vocation-mode. At present knowledge of such is vague and empirical. Sociology and psychology, however, have made a beginning in providing scientific data. Even empirical data may permit judgments probably valid in many cases. We can say of certain vocations with probable truth that they are characterized by 'professional' rather than 'trade' features, or that abilities in dealing with persons are dominant; e.g. in the case of primary school teachers, Y.M.C.A. secretaries, or travelling salesmen. We can discover prominence in managerial as against technical operative abilities, as in the case of 'industrial or commercial executives.' It is possible oftentimes to estimate accurately the degree of proficiency required in particular abilities. E.g. a railway telegraph operator must be able to 'send' at a rate of seventy-two letters per minute. Still more often a rough judgment is

possible. If from persons of approximately the same level of capacity several vocations draw their membership, it is a fair assumption that standards of proficiency are highest in those which require the longest preparatory experience. It is a fair assumption that proficiency in dealing with problems of the law is normally higher among judges of the United States courts than among practicing attorneys; that skill in the techniques of chemistry is higher among research professors of chemistry in the universities than among high school teachers of chemistry; that expertness in navigation is higher among ship captains than among ensigns; and so on. A classification of vocations on such a basis and an estimate of the value of preparatory measures are useful so long as preparatory measures are comparable and the factor of selection is taken into account.

Unfortunately such precautions have not been, in general, closely observed. A widely used classification of vocations divides them on the basis of amount in years of schooling normally possessed by practitioners. The character of schooling is entirely ignored. A classical high school is not distinguished from a technical high school or even a 'vocational school' of secondary grade; the arts college is assumed to prepare for vocation in the same degree as the professional school that grants also a bachelor's degree. The fallacy of selection is conspicuously overlooked even in sober 'scientific studies' reported by universities. For instance a state university has broadcast the facts that the upper levels in farming vocations are occupied in proportionately larger numbers by high school graduates than by grammar school graduates, and by its own graduates in larger proportion than by high school graduates. Along with these indubitable facts it publishes the conclusion that high school 'training' is superior to grammar school 'training' as 'preparation' for success in farming, and that the 'preparation' it offers is superior to either. Another study shows that the graduates of a particular university of ancient standing and high repute are more

numerously represented in "Who's Who" than those of any other. From the facts of the study numerous alumni have drawn the conclusion, and proclaimed it, that the 'training for success in life' provided by their alma mater is superior to any other. Their judgment appears to verify the prediction of their honored professor of Logic — that "it seldom takes." Its most hoary fallacy, *post hoc ergo propter hoc*, still flourishes among educated men as among other men. A great field of research is open in the study of specific life modes, the actual situations which they involve, and the specific traits of intellect and character that they demand.

The third group of characteristics of vocation-mode with which education for choice should be concerned includes the limitations of access to it and to the avenues of preparation for it. A youth should know what prospect he has of entering a vocation for which he is not inherently disqualified. The openings that are likely to occur in the vocation, the amount of 'capital' required, the difficulties of obtaining it, the trend of the vocation toward obsolescence or increasing development, where preparation is to be had and under what conditions; such facts are of import to the youth who seeks a promising field of life in service.

A fourth class has to do with limitations within the vocation-mode. The risks to health, life, and limb; the moral risks; the scope of resources in leisure activity and productive activity for intellectual, æsthetic, and moral development: such must be considered in the intelligent choice of a vocation-mode.

These four categories are neither complete, exclusive nor certain in the order of their priority: they are suggestive only. But whatever specific and general standards may be set up are of value only as they become points of reference against which youth may measure its own possessions. Hence every seeker of a mode of life should have a knowledge of his own resources and limitations.

The discovery of interests and aptitudes is sometimes regarded as an end in itself. The schemata of 'junior high school'

organization frequently indicate that conception of aim. But merely to take stock of oneself is not to qualify for intelligent choice of a vocation-mode. The discovery of an interest in insects, an aptitude for solving mechanical puzzles, or a capacity for literary expression, gives no basis for guidance until such be weighed in terms of future opportunity. For a boy to know that his intelligence quotient is 130 may do more harm than good unless he understand its significance with reference to his opportunities and obligations in life. Education should build up a system of tests and curricular adventuring to help the individual to discover what he has in the way of resources meaningful in social service rather than to discovery of all possible attributes that may be his.

5. Vocation-modes themselves furnish the chief resources of a system of education for choice. But these resources are very unequally accessible to educative use. No teaching agency is or can be so located as to have contact with all vocations. The number and variety of specific modes in any community or region is limited. Some are nearby in time or space, others remote. Tradition, which may sometimes be overcome, stands in the way of use of certain resources. There are, too, characteristics in some vocations that make any large use of them as teaching resources impossible. Farmers seldom refuse the use of their farms to teachers so long as no serious interference with the conduct of their business results. Many mechanics and artisans are proud to show and explain their work. An increasing number of industrial plants admit visitors under proper conduct if previous arrangements be made. There are, however, vocations in which the admission of visitors involves serious risk. The visit of a 'commercial club' to a Long Island duck farm is reported to have cost the owner a thousand dollars in dead ducks; the yield of a herd of delicately bred cattle may be cut down for a considerable period by unwonted disturbance caused by curious observers. The physician cannot admit visitors to his consulting room. It is hardly conceivable that a group of school boys should be assembled to

witness the rites of the undertaker. Limitations of the sort to use of observation are not uncommon.

Participation in vocation for the sake of experience is likewise limited, but not exactly as is observation. Boys and girls may find employment in vocations that are accessible geographically, if other conditions do not forbid. Boys can find work on farms readily enough, or girls in homes, but a given farm cannot provide for as many workers as visitors. Mercantile houses and industrial plants often have openings that may be filled by those who wish to 'sample' a vocation and to observe 'from the inside.' Professions, however, offer to young people few chances for genuine participation and scanty opportunities for worth while observation. In the majority of vocations an active part is denied to pupils below the age of fourteen.

Time and access to materials are limited in the case of any teacher and his pupils. It is impossible to give a full and vivid experience of all the vocations even of a village community. Hence selection becomes necessary. Beyond the major principles of choosing in terms of the probable and the significant for the majority of pupils is one further useful principle of selection. All farmers have certain problems in common, all teachers likewise, and all merchants, all engineers, all physicians, all housewives, all woodworkers, all mechanics, and so on. Vocations may be classified by genus and species — what belongs to the genus is found in the species. For example there are in dairy farming, as a species of farming, situations typical in greater or less degree of farming; so too in house carpentry or cabinet making as species of the woodworking genus; in selling drugs or selling hardware as species of merchandizing; and the like. These are the situations that should furnish the content of teaching. From them should be chosen those most representative in the scope of elements which they include. Using a saw, a plane, a hammer, preparing, assembling, and finishing a usable product in wood are generic processes in woodworking vocations. It is economy to choose

for teaching purposes a problem of the carpenter, the cabinet-maker, or the pattern maker, involving a coördination of the largest number of fundamental processes consistent with a genuine vocational undertaking. The incidence of the factor of probability may be illustrated at this point. Assuming a normal group of boys, if there be in general ten openings in carpentry to one in cabinet work, and two in cabinet work to one in pattern making, the first choice would be from problems of the cabinet-maker, and the last from problems of the pattern maker. It is quite obvious that more boys are likely to find an opportunity in carpentering than in cabinet-making, or in cabinet-making than in pattern making.

It is one thing to watch a man at work in the solution of his problems, quite another thing to sense a problem of one's own and to learn 'how it feels' by the attempt to solve it. The subjective aspect of a particular situation can be discovered only by meeting it. No means to self discovery in vocation-mode is comparable in vividness to direct participation in it. In the measure that a learner shares in a given mode of life to that extent he experiences the inner reality of it. The most certain test of aptitude, interest, or ability in a job is to undertake the job. Nevertheless limitations upon the use of vocational participation as a means to education for choice are severe. Most of them have been suggested already. But there is the further difficulty that many of the most probable, significant, and representative problems of accessible vocation-modes are such as no untrained and inexperienced person may hope to attack successfully. No method of 'try-out adventuring' can take the place of more or less prolonged and arduous preparation. Clearly the fact imposes the necessity for still more careful selection of resources. But the use of a number of problems of the kind has the advantage over the selection of those of simpler type that it tests in a very genuine way qualities of perseverance and effort, and the rate and ease of learning in particular traits.

Observation, if less intensive than participation, must play

a more extensive part in the 'sampling of experience.' Teaching 'projects' and 'practica' must be supplemented by such experience as can be acquired through the eye and ear. But priority lies with participation. The pupil is a keener critic of another and learns more in observing him after experience of a like sort himself. He has, in the old phraseology, 'an apperceptive basis' for interpretation of what he sees and hears. The fact emphasizes again the need for generic selection.

A youth who has had a first hand experience rounded out by critical observation of comparable activities of others is in a position to interpret usefully still more vicarious situations of vocation-modes. These may be found in readings, in tellings, and in pictures, which must inevitably play a large part in teaching for choice if the range of vocations studied is not to be greatly restricted. In present systems of 'guidance' they play often the sole part, and quite uniformly the prior part. In many towns and cities what is offered in the name of 'vocational guidance' may be summed up in a sequence of lectures, picture showings, and readings, intelligible and useful to adults of varied and extensive vocational experience, but largely futile so far as younger folk are concerned. In better systems such are followed by occasional observation trips to factories and stores, so that pictures recently seen or descriptions recently heard or read may begin to take on some meaning. In the best of systems, such as that of Rochester, New York, there is actual participation in typical undertakings so far as such can be provided in school rooms and shops equipped for the purpose. On the whole 'vocational guidance,' like many other fields of educational endeavor, has been so much concerned with 'background' that it has never got into the foreground at all. In placing vicarious information first, observation next, and participation, if placed at all, last in the teaching scheme, it has neglected consistently the time honored rule of teaching, 'Proceed always from the known to the unknown.'

7. Tests, of course, are rather means of obtaining the data of guidance than of guidance value in themselves. For those

who hold the deterministic view of guidance — that it is selective placement by authority — test data are the preëminent resource of ‘vocational counsellor,’ teacher, ‘personnel agent,’ or ‘advisor.’ But even in schemes designed to enable intelligent election by the learner, tests play a conspicuous part. Tests as measures of specific ability may undoubtedly be often valid. Tests of a series or group of specific abilities the results of which are interpreted to give measures of relative ‘intelligence’ among individuals, do, when worked out by scientific and careful men, often show a high and positive correlation with other and more empirical estimates of that undefined reality. ‘Intelligence tests’ of scientific origin, then, are useful in the degree that the traits they measure correlate with specific traits of intelligence required in this or that vocation-mode. Very little, however, is known at present of that correlation.

It is not unfair to say that ‘intelligence tests’ are frequently misused in ‘vocational guidance,’ as elsewhere. The abuse lies chiefly in misinterpretation of results and in action based upon misunderstanding. The Army, the Terman, the Otis, and the Thorndike tests — among the best that have been devised — have two limitations, apart from difficulties in the technique of using them, which have been overlooked by many who have assumed to use them. Such capacity as they do measure is a capacity to deal successfully with artificial symbols of ideas — letters, figures, pictures, diagrams; they do not measure capacities for dealing successfully with things or persons. Though intellect, morality, and mechanic aptitude are by no means discrete, it is hardly possible to come to conclusions as to social and mechanic potentialities from fractional evidence of intellect. Again these tests are group tests, and have little or no validity for the particular individual. We may judge from them, for example, that fewer individuals in the lower quarter of the scale will make good scholastic records than from the upper quarter of the scale. We may even go so far as to say that few of the lower group can succeed in the law and that more in the upper group might do so. But we cannot

tell from the results which they give which individuals in either group will succeed or fail. These limitations, frankly recognized by the scientific men who have devised the tests, have been too often lost from sight by the enthusiastic 'practical man' who seeks a short cut to results quick and positive.

If a boy be given the result of a series of scientific 'intelligence tests' with full explanation of just what it means, he has learned something of probable value to him in choosing a vocation. If Johnnie Jones, for example, falls repeatedly in the lower quartile of a series of genuine tests he should know that lawyers, engineers, and college professors are not largely drawn from that category. But to tell him that he, Johnnie Jones, is as completely shut out from such modes of life as if he were deaf, dumb, blind, and paralytic, is a sin against science, democracy and the boy. Tests should be used in teaching for just what they are worth and no more.

The age at which education for choice of vocation-mode should take definite form is uncertain. There is probably a lower limit, less likely that there is an upper one. Nobody, except a bureaucrat, knows what are the 'fundamentals' of all human living or even of the elements and instruments of all social life in our own country. Nobody knows, save a hidebound school administrator, how long it takes to master those 'fundamentals,' whatever they are. Educators agree fairly, however, as to what some of the fundamentals are and that the acquirement of them is normally a matter of years — probably not less than six. We do know that economic life does not, normally, make its demands upon the individual earlier than the fifteenth year. Education for choice of vocation-mode, then, should, on the basis of empirical judgment, begin not earlier than with the close of the twelfth year for the majority of children, and not much later, either, for the majority. A raising of the age standards for compulsory attendance may make postponement possible, if not necessarily desirable.

In its present organization and with the present qualifications

of its teaching and administrative personnel the public school is not well equipped to undertake the work of guidance. Nevertheless, no other agency has so extended and impartial a contact with the youth of our democracy. To increase the value of that contact for society and enrich the content of immediate and prospective life for youth is a recognized and growing function of the public school. Exploitation is less a danger and more controllable in a public agency than in any other. The setting up of a separate public agency to establish contacts with the same persons is a wasteful duplication. Hence, that guidance is a function of the public school is a rational thesis.

The period and the agency then are fairly defined in the 'junior high school' or its equivalent. With teachers qualified in understanding of the generic characteristics of vocations and of dominantly significant modes of life to which their schools are accessible, with an administrative organization designed to promote coöperative interaction between vocational institutions and the school, the junior high school may direct the activities of pupils in the media of vocational life to educative ends, and in considerable measure substitute choice for chance as the avenue to democratic self-realization in productive service.

But guidance is not a function of the 'junior high school' agency only. There are two groups whom it cannot serve fully. Many adults are misplaced in the "mode of life" which they follow. Education is concerned with them not in 'up-grading' only, but in redirecting them to choice of a mode appropriate to their needs. An extension of the school to reach such persons is implied. Already we have it in one form or another from universities and land grant colleges and, in a few large cities, from the high schools and grade schools of the system. Evening schools, part-time schools, public lectures, and so on are growing enormously in their extent and influence. But as yet they have been little concerned with guidance, except as veterans of war and the disabled in industry are concerned. One great service that such extension teaching may

render is in enabling the victims of chance to start again not wholly by chance.

Second is that considerable group of the higher levels of intelligence and the more fortunate in pecuniary circumstances to whom early choice of a specific vocation is neither necessary nor desirable. Those who at the 'junior high school' stage discover that they are not disqualified for certain professions or forms of business may well be guided into schooling which is not specifically but generically preparatory to such, and may choose the particular mode and enter the specific preparation only after a lapse of years. The appropriate thing for many of them is to prepare for college and to enter upon a college course, which in its initial stages, at least, is not professional.

At present our colleges turn out graduates quite as blind to the opportunities of life and their own aptitudes for particular modes of it as do our elementary and high schools. Recognition of the need for guidance at the college level is growing. Deans of men and deans of women are more and more concerned with the problem. 'Orientation' courses are springing up, no longer optional but required of all freshmen. 'Junior colleges' are coming in, not often, but sometimes developing under the philosophy that dominates the 'junior high school idea.' Our state universities and colleges, at any rate, as institutions for democratic service must bestir themselves to see that their matriculants are equipped to choose a mode of life and to prepare for it with a definite purpose in mind.

SUMMARY ABSTRACT

1. Men are born of unequal capacities, mental and physical. They are born into differing environments. They are equal only in the right to happiness and the duty of service according to their capacities. It is the function of democracy, not to reduce them toward an impossible sameness, but to provide each with the best possible opportunity for development of his aptitudes for service and happiness.

2. As an instrument to attainment of the ends of democracy, then, education should help every boy and girl and man and woman to discover his fit and proper mode of satisfying service. For most that mode is in some vocation with its concomitant and conditioning leisure.

3. Education cannot give to everyone knowledge of all significant features of all vocation-modes, or of his promise with respect to each and all of them. It can, nevertheless, reduce greatly the inefficiency and unhappiness that come of mere chance and ignorance in choice of vocation-mode.

4. Vocations belong to genera as well as species. Accordingly it is possible for education to deal with such as exhibit generic characteristics — or to undertake guidance in terms of types. In all such, as preliminary to choice, it is desirable that the individual should be aware of:

- a. The minimum requirements in mental and physical qualification necessary to admission.
- b. The characteristic abilities necessary to 'carry on' in the vocation-mode.
- c. The limitations of access to the vocation-mode and to preparation for it.
- d. The risks and limitations within the vocation-mode itself.

But such knowledge is of little value except the individual have knowledge of himself — his aptitudes and interests — in reference to the demands and opportunities of the vocation-mode.

5. For adventuring and discovery vocation-modes themselves furnish the prime resource. But they are quite unequally accessible to teaching use in the case of a given group of pupils. Hence, selection in terms of type vocations and type situations within them is imperative to effective and economical teaching for the sake of choice.

6. The most real and vital means to knowledge of vocation-mode in relation to oneself is participation in it. But it is a means distinctly limited. Observation permits of use of a wider range of resources, but is second to participation in vividness. Instructional information allows use of abundant resources, but is far behind the other means in convincing reality of experience. Moreover, it is largely futile except as it is founded upon first hand experience through participation and observation of activities typical of those with which it purports to deal. No test has yet been devised which will take the place of active adventuring in the economic medium. But tests have a place in discovery of aptitudes and resources in the individual.

7. The designation of the 'junior high school' agency and period for discovery of vocation-mode is purely empirical, but nevertheless rational. In the present, at least, education has a responsibility to the college student and the misplaced adult worker as well as to the adolescent school pupil.

CHAPTER XI

THE PREPARATORY FUNCTION OF VOCATIONAL EDUCATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Consider any one of the following jobs which a 'vocational teacher' may be required to undertake. Then make a list of six specific things that the teacher must 'know or be able to do' in order to do the job successfully.

- a To teach a group of six adolescent farm boys to cull a farm flock of White Leghorn hens.
- b. To teach ten high school senior girls to select material for their graduation dresses.
- c. To teach a girl of sixteen who has completed eight grades in the elementary school to draw up a daily balance sheet.
- d. To teach a group of normal twelve-year-old boys to sharpen a jack-knife.
- e. To teach a group of agricultural college students the 'law of diminishing returns from land'.
- f. To teach a group of graduate students in education to score a school building.

2. How would you determine whether or not any one of the foregoing lessons should be taught to the group or person mentioned?

3. What is the 'content of a course of study'?

4. Make a brief but comprehensively accurate statement of the aim of a course preparatory to the work that you are doing or expect to do.

5. What aspect of vocation should be emphasized in the preparation of a lawyer? In the preparation of a locomotive engineer? In the preparation of an eyelet machine operator?

6. Suppose a newly established state is to set up a system of vocational education. Which should be set up first, schools of medicine or schools of engineering? Schools for teachers or schools for stenographers?

7. Assume in the following cases the vocation named, a pupil desirous of qualifying for the vocation but lacking experience of it, and the necessity for choosing between the alternatives. Which would you choose to teach, and why?

Vocation — Commercial Poultryman

- a. Feeding laying hens or 'dry picking' fowls?
- b. Killing mites or caponizing cockerels?
- c. Culling pullets or trap nesting?
- d. Using dry mash or using wet mash?

Vocation — Housewife

- a. Making bread or making fudge?
- b. Making beds or painting chairs?
- c. Feeding an invalid or making a hat?
- d. Hand washing or using a washing machine?

Vocation — Village Carpenter

- a. Building a closet or making a bread board?
- b. Laying shingles or building a mantel?
- c. Planning a barn or planning a church?
- d. Mortise and tenon framing or 'balloon' framing?

Vocation — Teacher of Mechanic Arts

- a. Organizing a 'project' or cataloguing references?
 - b. Giving an examination or conducting a practicum?
 - c. Operating a moving picture projector or sketching on the blackboard?
 - d. Giving a lecture or leading a group discussion?
8. Should a blind boy be refused admission to a course in machine design?
 9. Should a 'five footer' be refused admission to West Point?
 10. Is it just and democratic to set up different course objectives in schools for deficient and in 'professional schools'?
 11. Should Chicago add to its school system a part time school for detectives open to those who have certificates of graduation from the elementary school?
 12. Should the hours for apprentices be the hours of the trade? If not, under what conditions should they be different?
 13. Should girls in the home economics course who like sewing be required to do more sewing than those who do not? Vice-versa?
 14. Select from the following list of places those which are appropriate respectively to the several courses named:

<i>Courses</i>	<i>Places</i>
Navigation and seamanship.	Delavan, Wisconsin.
Department store management.	Newport, Rhode Island.
Irrigation engineering.	Kansas City, Missouri.
Dairy farming.	Imperial, California.
Iron puddling.	Brockton, Massachusetts.
Shoe lasting.	Bethlehem, Pennsylvania.

15. Assume three groups of boys of approximately equal intelligence, but differing in their experience as follows:

- Group 1. Have worked on dairy farms in central New York.
- Group 2. Have worked on fruit farms in Niagara County, New York.
- Group 3. Have worked as grocers' clerks in Brooklyn, New York.

Assume that all three groups desire to become proficient in fruit growing. To which group or groups would each of the following lessons in agriculture probably be appropriate:

- a. Learning to harness a team of horses?
- b. Learning to apply lime-sulphur wash?
- c. Learning to identify fire blight?
- d. Learning to head a barrel of apples?
- e. Learning to distinguish a pear tree from an apple tree?
- f. Learning the standard retail packages for apples?

16. Assuming a location in the neighborhood of Cleveland, Ohio, and a demand for the courses, *when* would you offer such courses as:

- a. Automobile repair?
- b. Harvesting and storing ice?
- c. Canning tomatoes?
- d. Dock loading?

17. Given two groups of girls preparing to be homemakers but differing in the matter of schooling as follows:

- Group 1. High school graduates.
- Group 2. Left school at end of third grade and went to work in paper box factory.

To which group would the several problems following be probably most appropriate for teaching purposes:

- a. Laying out a monthly budget?
- b. Redecorating a dining room?
- c. Determining the caloric values in sample menus?
- d. Tracing out the chemical conversions in the metabolism of starch?

18. Assume three groups of boys who have entered upon training for the merchant marine:

- Group 1. Brought up in the neighborhood of Portland, Maine.
- Group 2. Brought up in the neighborhood of Carson City, Nevada.
- Group 3. Brought up in the neighborhood of Memphis, Tennessee.

To which group or groups would the following be probably useful lessons:

- a. Learning the difference between the bow and stern of a vessel?
- b. Learning the location and use of the capstan winch?
- c. Learning the location and use of the plimsol mark?

AIMS AND SELECTION OF CONTENT

1. Education as a preparatory measure implies, of course, a forecast or prognosis of the future activities of the educand. It is preparatory in a genuine sense only as it changes him in knowledge, skill, and attitude with reference to what he is to do and what he is to be in the vocation to which he looks forward. A preparatory course for teachers of agriculture, for example, is really preparatory only as it enables the graduate to do and appreciate the work of the teacher of agriculture. The basis for formulation of such a course is careful prognosis of the situations which the teacher of agriculture, as teacher of agriculture, will meet. The meeting of every such situation implies possession by the teacher of certain knowledges, skills, or attitudes. If, for instance, he must teach high school boys to judge dairy cattle he must possess a rather high proficiency in the technique of examination and comparison of dairy cows; knowledge of the standards of type, form, constitution, udder, etc., and of their relation to 'show' value or productive value in dairy cattle; and an attitude favorable to the use of judging.

Again he must be fairly proficient in the technique of conducting a field practicum in teaching; possess a knowledge of the purpose and function of judging practice in reference to the needs of high school boys; and an attitude favorable to dealing successfully with a practice group in judging. A preparatory course must provide that the prospective teacher shall acquire such abilities of judge and teacher as he does not already possess. What the course provides in the way of teaching situations appropriate to the acquirement of these abilities will make up the content of education preparatory to teaching the judging of dairy cattle.

Put in another way, the content of any genuinely preparatory course is a series or composite of teaching situations designed to develop particular techniques, technologies, insights, points of view, desires, and the like, which are required for efficient and satisfying adjustments to particular situations in the field of life activity which the pupil designs to enter. Often, of course, preparatory education looks far ahead, as when in preparation for medicine the medical student acquires in his first year knowledge which is expected to function in a profession upon which he will not enter for six years at least; or, as when in preparation for farming the student attacks problems of farm management, though he is unlikely to become the operating manager of a farm for some years after completing the preparatory course. On the other hand, preparation may be made for meeting situations very soon to be met. Much of the 'short course' and 'part time' work of vocational schools, particularly work with adults, looks to functioning of what has been learned almost at once. Instruction and practice in grading apples may be given on Tuesday afternoon and those trained set to work as employees in commercial packing houses on Wednesday morning. The teaching of employed workers for the sake of improvement in the work they are doing daily is preparatory — since gain in proficiency, knowledge, or appreciation of the job is designed to function not in what they have just done, but in what they are just going

to do. That is, to repeat, all preparatory education looks ahead.

To look ahead is to contemplate a prospective result — to have an aim. In education the immediate aim of the educator is always a person changed in some way as to his ability to do, to understand, or to feel. The conditions of environment and activity which bring about in him the desired changes are the content of his education. So, for a boy who expects to be a carpenter, one aim may be ability to file a saw. The raw material which the educator receives is a boy who cannot file a saw; the result which he contemplates — his aim — is a boy who can file a saw. With that aim in view he determines what he must do to cause the boy to learn to file a saw. The situations which he sets, and in which the boy 'reacts' with a result in acquirement of the desired skill — those make up the content of teaching.

The importance of having an aim is that it serves to guide the educator in selecting the content of courses or studies or lessons. Everyone would ridicule or pity a manufacturer who located, built, equipped, and manned a factory before he had made up his mind what he was to manufacture in it. The factory is a means to production, and the canny manufacturer knows it. He sees that the means are appropriate to the end he has in view, and he can see them as appropriate only because he does have the end in view. So any organization of school, or of courses, or of lessons is ridiculous or pitiable which is not designed appropriately to a contemplated result in learning. Unless the educator knows his aim he has no basis for organization of the process of educating anybody.

The function of educating is too often confused with the purpose of educating. Many a school principal thinks of the aim of his supervision merely as 'to supervise'; many a teacher finds no other aim in teaching than to teach. The laboratory manual which states solemnly that the purpose of the study of the corn plant is to study the corn plant represents a point of view, or lack of view, that is unfortunately not

unique. It may seem like splitting hairs to distinguish between function and aim in education, but the fact that the distinction is not made in the minds of many who administer schools and teach pupils is responsible for much waste and futility of effort in the name of education. Not infrequently we school men have been hard put to it to find excuse for much that we have called content in our schools, because we have thought of it more or less vaguely as an end in itself, or at best a sort of fodder. City school systems have had to call in 'expert surveyors' to help the authorities find a reason for what they have been doing. It is as if a manufacturer should call in a 'surveyor' to tell him why he had been using certain machinery.

Sometimes school men — and the trade school people furnish many examples — think of what the pupil 'gets done' or 'gets made' as the end and directing aim of the educative process. They proudly exhibit the products of their schools, not as human beings who have been improved in knowledge, skill, and appreciation, but as Morris chairs and cedar chests, dresses and hats, calves and pigs, maps and working drawings, printed cards and plates, or even buildings constructed and finished inside and out — in short, things which the 'school has made.' What we must do to get a thing made, by pupils or by anyone else, is not by any means always the appropriate process of educating a pupil to make that very thing. A first class wooden dwelling house built by boys under a teacher or a row of well made dresses completed by a class of girls under a teacher is not a certain index that any boy is capable of building a house or any girl capable of making a dress, though neither teacher has laid a hand to construction. Enough has been said in discussion of the decline of apprenticeship to indicate that an aim in economic utility is not certainly a safe guide to educative process for the producer of it. Implications both for content and method of the economic aim, or any other aim of material result, for that matter, may be unfortunate for education. More will be said of the direct influences of such

a conception of aim upon the teaching process in a later chapter.

Content, then, is the educator's design of the educand's experience through which a series of particular objectives shall be accomplished. Each of these immediate and particular objectives contributes an element to some larger compound of change, or is a step in the achievement of a larger aim of education. It is convenient in approaching the task of selecting educative content to start with the larger contemplated result and to break it down into its elements — or to derive objectives from ultimate aims. Every ultimate aim, or final whole in contemplated result, is a guide to conception of the contributory results, which we have called objectives.

When a man undertakes to build a house he normally starts with a conception of the house as a whole, not with the thought of a lot of doors and windows and floors and ceilings and rooms and hallways, etc., which finally add up in a house. Having in mind the kind of house he wants he next determines what that kind of house requires in the way of rooms and hallways and closets. These, in turn, enable him to see what he needs in the way of windows, staircases, floors, and the like. Having arrived at some such conception in detail of what his house building is to accomplish he is ready to decide what he must have in the way of materials and what he must do or have done in the way of labor. Roughly we may say that the ultimate aim of a house implies the objectives of rooms, doorways, windows, and so on, each of which in turn serves as an index to the process of construction.

In like fashion suppose an educator conceives an aim of his school as a competent drainage engineer. At once it is implied that he must produce a graduate capable of laying out a drainage system. One who can lay out successfully a drainage system is one who can, among other things, install an outlet. One who can install an outlet is one who knows the amount of water that the outlet must discharge under given conditions of rainfall, topography, and soil; who knows the proper location

of the outlet; who knows the size of tile capable of discharging the given load under the given conditions of size, frequency, pitch, and angles in mains and laterals; who knows the kind of tile durable enough to meet requirements; who knows the mode of support and protection necessary to the successful maintenance of the outlet; and so on and so on, through a long series of objectives necessary to the qualification of the competent engineer. Having by analysis of his ultimate aim determined the particular objectives of the preparation of the engineer, the educator is in a position to select the content of courses of instruction and training appropriate to the accomplishment of the several objectives and through them of the ultimate aim.

2. No statement of the aims of all preparatory vocational education is possible in other than extremely abstract form. In the light of previous discussion, however, I venture to sum up the generic aims. Education preparatory to vocation should in the large and in the long run be designed to the accomplishment of the following ultimate aims:

1. Aim as respects the individual —

Every citizen an efficient and appreciative producer in his chosen and appropriate vocation.

2. Aim as respects the economic group —

Every vocation, concern, and industry an efficient institution productive of worthy social utilities, and a wholesome medium for the individual producer in its membership.

3. Aim as respects economic society —

An integrated and stable organization of economic institutional units progressively responsive to the needs of humanity.

Such abstract and idealized ultimate aims for vocational education may serve, not altogether vainly, as background from which to derive subsidiary proximate aims or general objectives — general in the sense that they are inclusive of elements that commonly should guide the organization of all education preparatory to economic service and self-realization. The

suggested general objectives following, for example, will be found to derive logically from the stated ultimate aims, and to harmonize with them.

1. To produce economic goods — commodities or services — efficiently every individual producer

a. Must be one able to perform the *labor* of production. Lawyer, merchant, teacher, farmer, mechanic equally must *do* what is necessary to producing the utility which is his economic contribution.

b. To do appropriately he must be one who *knows* the technologic facts, principles, and standards which govern the conduct of efficient productive labor in his vocation.

c. Must be one who *will* do and know the things which production in his vocation demands.

The individual must possess the *art*, the *science*, and the *motive* appropriate to producing the utility to which his vocation is designed. That means possession of bodily and mental qualifications of specific character, including particular habits of overt activity, awareness of the form, properties, and uses of his product, awareness of standards of achievement in process, such as the factors of speed, accuracy, and organization, and a disposing impulse bound up with his skill and knowledge.

Just what may make the activities of a productive pursuit so worth while to the producer as to constitute a calling no one can predict with accuracy. The sources of intellectual, emotional, and sensory value in those activities vary greatly with the individual. It is, nevertheless, important to recognize that there are desirable objectives in vocational preparation which contribute little or nothing to productive efficiency. To find beauty in the texture of cloth will not count for efficiency in cutting and basting, but it may count toward making the tailor's pursuit a calling. To know that the soil he plows owes its fertility to an origin in disintegration rather than of decomposition will not cause the farmer to alter the set of his

plow but it may add to his satisfaction in working his farm. To know why the pole before his door is banded red and white will not give the barber a lighter touch with the razor, but it may make his trade more worth while to him than it would be without that insight into the history of its growth. There are, as we have seen, many pursuits under a refined division of labor in which very little of understanding is required to produce, but in which much insight may make the job worth while.

It is, perhaps, safe to say that in the large a man who has found a calling:

d. Is one who is aware of rhythm, harmony, deftness, power, and the like in his labor.

e. Is one who is aware of scientific, æsthetic, historical and social bearings of his job; who knows it in some of its natural, human, and spiritual significances, and feels the worth of it.

f. Is one who through learning has bound the native impulses to activity and accomplishment with the productive work he has to do.

g. Is one who is alert to possible means of improvement in his own producing activities or in the organization of the productive group to which he belongs.

Knowledge of interdependencies and a sense of obligation to play his own part well on the part of the individual producer make for institutional efficiency and stability; a habit of open minded alertness to improvement makes for progress in intra-institutional organization. The work of the sole buffer and trimmer is conditioned by that of the sole cutter; the pattern maker depends on the draftsman, the foundryman on the pattern maker, the lathe mechanic upon the foundryman, and so on. The teacher of chemistry owes a duty to the teacher of English; he can support or break down her contribution measurably. Dentist, surgeon, and general practitioner must cooperate for effective service to the patient. Again the worker must be ready to modify his ways reasonably to meet the needs of his fellow workers. If a worker in the

shipping room hits upon an improved method of packing, his fellow packers, the foreman, and the superintendent must be ready to give it acceptance and to modify their work in accord with it. Most men contribute to progress by sanction and promotion of innovations proposed by others, but any man may at some time or other contribute by an invention of his own. The managing officer who is ignorant of or unsympathetic with the requirements of shipping room, pattern shop, drafting room, etc., is as much an impediment to progress as is any group of operatives who are ignorant of or unsympathetic with the obligations and policies of management. A concern or industry is likely to be unstable and quite certain to be unprogressive in which the members lack understanding of the standards and needs of the business.

3. Institutions do not stand alone. The need for understanding and responsibility by the individual producer does not end in the institution in which he is producer. The producer who is an efficient member of the economic state:

a. Is one who is an intelligent and sympathetic coöperator with groups of producers and individual producers who are remote from him in time and space; in short is one who identifies himself with the economic civilization in which he lives.

b. Is one who knows the essentials of the *status quo* and of the major trends in economic society.

c. Is one who is disposed to justice and possesses largely conceived standards of justice in economic relations.

d. Is one who has the sense and habit of responsibility for contributing to the welfare of consumers of final products to the value of which his own vocational efficiency may add.

An understanding in cross section of the place and function of his vocation in the economic whole, on the part of every worker, makes in general for social stability. It may make, on the contrary, for discontent and desire for revolutionary change. Change, to be constructive, must accord with the laws of social evolution. Hence a view in perspective of

the development of vocations in their social relationships is desirable, both for clear understanding of present needs and for proposal and evaluation of means to improvement. The attitudes of some manufacturers toward immigration; of some 'labor groups' toward 'wage scales'; of some farmers toward tariffs and credit schemes and marketing adjustments; of some school men toward changes in curricula, too often exemplify the dangers in partial understanding of actualities and impartial ignorance of historical trends.

The most conspicuous general lack among producers is the lack of responsibility to the consumer. So far has specialization removed the average producer from the consumer, his brother, that he does not recognize him as such. The 'factory hand' tends to limit his responsibility to 'doing right' by his shopmates and 'getting by' with the 'boss.' The manufacturer tends to the belief that his duty ends in 'making good' with his stockholders. College professors are not rare who are far more conscious of obligation to their colleagues than to their pupils. To develop a strong sense of obligation to the consumer, for whom all 'goods' are produced and in whose enlarged opportunities for service and happiness is found the chief social justification for division of labor, should be a recognized function of vocational education.

4. Some implications of the foregoing aims can be made quite specific. In the case of vocations, concerns, and industries of many kinds the objective demands for qualification are readily discoverable. A beginning has been made in analysis of vocations and organizations of productive activities which has already been fruitful in improvement of vocational schools and courses where the end of productive efficiency has been held clearly in view. On the subjective side the problems of specifying implications for education are very difficult, and very little has been done. Part of the failure to develop anywhere the implications of calling at all clearly seems to be due to the dominance of the efficiency aim. Behind the promotion of much that has been put forward in recent years in the name

of vocational education appears a philosophy that sets far more value upon the individual as a productive instrument, or cog in the machine, than upon the human being who lives in his work. The socialistic view of the uses of man has taken precedence over the humanistic. A part of the opposition to further development of vocational education, which is in many places manifest, is due to a feeling that the human side has been neglected. If the premises and logic of the argument hitherto developed in this volume are sound the proper aims of vocational education should as clearly recognize the worth of the individual *per se* as the worth of the social atom. Even such an attempt at statement of aims as has been made in this chapter makes that evident. In so far as such a philosophy shall come to influence administration of vocational education conflict between the socialistic and the humanistic viewpoints will give way to the democratic. A formulation of aims, then, from the democratic standpoint is, it may be hoped, not entirely useless.

The aims stated, however, must frankly be recognized as ideals — as, of course, all dynamic aims inevitably are. No one will be so naïvely Utopian as to look for their complete realization even among our great grandchildren. But vocational education has been with men for several thousand years. It is far older than democracy or socialism. With the recent growth of democracy the expansion of vocational education, if trailing far behind the expansion of need for it, has been rapid. One is not a futile idealist who looks to a growth that shall give from decade to decade or from generation to generation at least, efficiency and happiness to a constantly increasing proportion of the workers of the world, and a constantly strengthened integrity and efficiency to democratic civilization founded on a democratic economy.

No man, perhaps, can be taught to meet every requirement that pursuit and calling may lay upon him. The life of teacher and pupil is too short; the capacities of teachers and pupils are too limited; the resources of knowledge and materials at

any place in the world are too restricted. What we attempt to teach, then, — the content of vocational education — must be that which counts most towards realization of our aims. That conclusion points to the need for careful selection.

The first incidence of selection appears in a difference of emphasis upon the aims of vocational preparation according to the vocation and to the man with whom we deal. Examples of such differences may be briefly suggested.

In the field of factory industry already half the vocations are so stable or simple in their demands for efficiency that mastery of the essentials is a matter of hours or weeks rather than of months or years. Opportunity at the job with a minimum of direction is all that is required. So far as efficiency is concerned, then, the problem of vocational preparation is chiefly to secure for the learner access to experience on the job. Education will emphasize the appreciative aim — developing with the learner the more simple and immediate artistic and scientific implications of the work he does, and the institutional and social implications most essential to intelligent responsibility. Teaching will be more concerned with the value and significance of the job than with the doing of it.

In vocations of larger scope, however, education will be largely concerned with the direction of job experience for the sake of skill and technology. The 'apprentice teacher' and the interne must have close supervision of their participation in productive service in order that pupils and patients may not suffer through their errors, as well as that they may learn more effectively the technique and technology of their respective professions. Thus in vocations wherein the professional aspect looms large technical proficiency cannot be considered a minor problem of preparatory education. Further, many such vocations include a technology so wide in scope and so extensive in its immediate bearings upon efficiency that it furnishes in itself insights largely sufficient to appreciation. A physician, to do his work, must know why as well as when and how to use a certain technique.

In simple vocations characterized by fixity in objective features the prime purposes of preparatory education are in understanding and appreciation. In complex vocations of less fixity in their features the purpose of appreciation is relatively subordinated to that of efficiency. Appreciation, so to speak, takes care of itself if efficiency be achieved.

Inventiveness as an aim probably deserves particular emphasis in the case of the exceptionally intelligent members of a vocation. By the same token emphasis upon institutional progress is probably more worth while for such than for the run of men. The superior man is more likely to be a leader and to have a larger part in the promotion or retardation of institutional development than men not his equals in intelligence. Hence his understanding of institutional development and his sense of personal responsibility for it become doubly important.

Emphasis upon a relatively complete achievement of social understanding and responsibility should be great in the case of vocations in management and direction of economic institutions. The employing entrepreneur is distinctly in need of development here. His position is one of inevitable power and influence and he is responsible for many of the evils as well as for much of the good in modern society.¹ Whenever influential leadership is a function of vocation the need is the same. Followership also has the need, but the range and scope of social objectives need not be and cannot be so great as with the prospective leader. From the simplest and least of vocations to the most complex and influential of vocations we should place far more emphasis upon such objectives than yet appears in education.

5. The program of objectives as a whole must, for a long time to come, vary in its incidence upon prospective vocational groups. We have made a beginning of formal vocational preparation, and, on the whole, we have begun in the right place.

¹ E. A. Filene — *Harpers Magazine*, Dec., 1923.

Not always, to be sure, have we begun with groups whose need for education is greatest, nor always have we considered closely the relative social values of those vocations with which we have started. Nevertheless it is not accident or privilege that accounts altogether for a beginning with professions and long recognized crafts. A priest and a physician are not in any absolute sense more worthy servants of society than a heel cutter and a candy packer. But the need for high qualifications with the first two is unquestionably greater than with the last two. What they do affects not a greater number, perhaps, but certainly more significantly and vitally the lives of others than do smooth and well tapered heels and neatly packed and pleasing candy packages. Moreover the ministry and medicine are more certainly permanent institutions than heel cutting and candy packing. Both high social significance and the prognosis of permanence are rightly factors in determining priority of development in formal preparation for vocation. That from the social view point farming should take priority to barbering, plumbing to orange wrapping, and cooking to 'butlering' is hardly to be disputed.

6. In the case of any given individual or group, then, the content of vocational preparation is to be derived from a study of the particular art of production in which the prospective pursuit and calling centers. On one side of the art lie (1) the controlling technology that directs it, and (2) the æsthetic and scientific backgrounds of the art and the technology. On the other side lie (3) the institutional and (4) the economic-social implications contributory to appreciation, integrative sympathy, and conscious responsibility for progress. Or, schematically the content sources may be outlined as follows:

Scientific and Æsthetic Background.	Technology ← of Vocation.	Art of ← → Vocation.	Institutional Meaning of → Vocation.	Social and Economic Background.
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7. We now face the problem of selecting from among the multitude of possible situations represented in the schema

those which may most economically and effectively be used for teaching purposes. To do so we must have certain criteria of selection. Before proposing such let us assume two postulates:

1. Education is a short cut to qualification — an avoidance of the waste and error of unguided experience.

2. A learning experience is most certainly effective in the degree that it approximates the vocational experience for which it is designed to prepare.

Preparatory education to be economical must ensure the ability of the learner to meet effectively the significant situations of vocation that lie before him. A given situation may be significant chiefly from the social angle, or the value of it may reside largely in individual satisfaction. It is of prime significance to society that the surgeon shall make his incisions for removing the appendix with proper and aseptic instruments and with the utmost of steadiness and accuracy, but it makes little difference to society or to the patient how the surgeon 'feels about' that operation. So long as he does the job the social end is served. But the individual significance of the operation does not lie at all necessarily in mere successful performance. To the surgeon it may be disagreeable routine, the only satisfaction in which is derived from 'getting it over with.' On the other hand it may be a gratification of professional pride, a means to discovery of new and superior technique or understanding, a means to verifying or disproving an hypothesis, or in any of a score of ways a highly significant experience.

The situations which must be met 'to get the job done' are more easy to evaluate than those which are chiefly of individual significance. Observers may make a ready analysis of the processes of bricklaying or 'charging a jury' and come to some agreement as to what are the essentials in either, but they cannot at all readily isolate and order the elements that give such work value in the experience of the doer of it. By study of the work of many lawyers, physicians, teachers, dairy farmers, carpenters, stenographers, mechanics, and so on, it is possible to

determine what jobs are normally done by each, which jobs and what features of them count most for accomplishment, and to establish a system of priority in significance for production among them. Therein is a function of the vocational survey and the 'job analysis' which play so important a part in the development of systems of vocational preparation. But equally important is the discovery of the elements of vocation that contribute most to appreciation. Something is to be had from the reports of workers, but the difficulties are great. Even when the 'objective situation' is readily identifiable and controllable individuals vary so in nature, 'set,' and previous experience that 'inner responses' are vastly more unpredictable than 'outer responses.' The reports of such are still more so. The person of low intelligence and he who is unused to self analysis can give very little of certain utility to a program of subjective aims. It is at this point that the teacher experienced of the vocation is so necessary. He has first-hand knowledge of subjective values, which, if they can by no means serve for all his pupils equally, enable him to follow their several interests.

This vocation for which he prepares lies ahead of the pupil. It may be his work tomorrow or next week or next year or much later, but it is always a *future* activity. Hence we have more than diagnosis to make in the planning of a course of preparation. We have prognosis to make. In doing so we must lay emphasis upon the *probability* as well as the prospective significance of the situations to be met in vocation.

The past is our only guide. Trends and developments within the vocation or within vocations most similar to it point the way. Within a vocation some situations are less and less frequently to be met, others are constant, others increasingly recur. Less and less the house carpenter is concerned with mortise and tenon; as much as ever he deals with the laying of flooring; more and more he uses such tools as the power drill. Less and less frequently is the general practitioner of medicine called upon to extract a tooth; as often as ever he must take

the patient's temperature; increasingly he is concerned with measuring blood pressure and taking bacterial cultures. The dairy farmer is more and more rarely concerned with building a stone wall or laying a rail fence; as surely as always he must deal with the raising of calves; more and more often does he meet the problems of selecting a pure-bred sire and repairing and operating power machines. On such grounds education in the selection and use of the power drill for the carpenter; in the use of the sphygmometer and interpretation of its readings, for the general practitioner of medicine; in the selection of pure-bred bulls and the purchase and operation of power machinery for the dairy farmer; is more probably usable in the future of vocation than is for them respectively, training in the making of mortise and tenon joints, extracting troublesome teeth, or 'laying up' a stone wall. That is, the constant and the coming features of vocation are those which enable prognosis. The norm of the future vocation is, in most cases, predictable as in advance of the present norm.

In the chapter discussing characteristics of vocations it has been pointed out that the distinction between profession and trade may be founded upon a difference in the preponderance of variant and fixed situations in vocations. In general when persons and ideas play a large part in production it is impossible to make prognosis of the exact situations to be met, whereas if material things constitute major factors in determining productive activity prognosis is quite certain. These facts are of considerable import in the selection of content for vocational preparation. If all that we can predict is that a man will meet a certain *kind* of situation, the best that we can hope for is to develop in him *adaptiveness* to situations of that character. On the other hand, if we can predict with minute exactness just what situations he will meet, we can *adapt* him quite perfectly to the productive demands of his vocation. Thus we can seek no more than adaptiveness in teaching an architect to plan a house, for we know only the kind of problem he will meet; but we can adapt a carpenter to laying shingles, because we know

quite exactly the situation he will meet. We can help a physician to adaptiveness in diagnosing diseases of the respiratory tract; we can develop almost automatic skill in the dentist in extracting teeth.

8. Psychology insists that learning through response to a particular situation will be usable in another situation in the degree that the two are alike. This is the doctrine of transfer by common elements — or the modern conception of mental discipline.¹ It means that the pupil who, under direction of a teacher, solves successfully a particular problem or does a particular job will profit by his experiences mainly, if not wholly, when he faces a problem or job like the first. A girl who has made a shirt waist for herself has learned a great deal that will help her in making a shirt waist for her mother, less that will help her in making a shirt for her father, still less of use in making a suit for her brother, and probably nothing at all of use in feeding the baby.

The doctrine implies that we must choose for teaching situations those that resemble the situations of vocation most closely. The first criterion for selection among the possible situations of vocation is *type*. The teaching experience should give a good sample of the *kind* of experience to be undergone in vocation. We may group the jobs and problems most probable and significant into classes according to their likenesses, and then choose from each class representative experiences having the largest probable 'transfer value' to other situations of its class. The 'case method' that is used in law schools is valuable as preparation for the intelligent practice of law very much in the degree that the 'cases' selected for teaching purposes are typical of the several classes of law problems that the prospective lawyer is likely to meet. The specific problems of feeding, manuring, rotation, etc., 'presented' to the student of dairy farming are to be valued as preparatory experience in the same way. When the exact situations of a vocation cannot be predicted perfect adaptation cannot result from education.

¹ E. L. Thorndike — Educational Psychology.

But by learning acquired through type experiences the worker may approach a new problem with a sense of familiarity and a habit of attack usable because of its likeness to problems with which he has already dealt.

In what I have called the trade aspects of vocations the situations are so fixed and stable that type selection represents not similarity of educative experience only but practical identity. The learner may do the thing or solve the problem in all its details exactly as he as worker in vocation will be called upon to do. Transfer is very nearly if not quite complete. The only variant in the situation is the worker himself. When such a state of affairs exists it becomes possible to 'fit' the man for his job so far as production is concerned. By practice we can reduce his responses to a definite habitual or quasi-automatic basis. This it is desirable to do if the situation to be met arises *frequently*. Perfected habit, so long as the situation remains unaltered, makes not only for speed and accuracy, but sets free the attention of the worker for mental activities of another sort. To make a man a machine in some respects is to enable him to be a man in others. Response by correct touch on the correct key at sight of a given note is absolutely essential to the freedom of the pianist. The carpenter should not face a problem for reflective thought every time he drives a nail. It is a means to freedom for the accountant if he is in many respects a living comptometer. Even the teacher should not pause to weigh and reflect when called upon to write the spelling lesson on the board. The words correctly spelled should flow from her crayon automatically. Thus a second criterion is suggested. Select from vocational situations for habituation through practice those which are most *frequent*.

In many vocations, as in other categories of life, there arise from time to time situations which have little likeness to others, or 'transfer value,' and nothing of the frequent recurrence that makes habituation desirable, but which, nevertheless, the worker must meet successfully. For example, the farmer may go for years without a case of bloat among his

animals, but when bloat does occur he must treat it successfully or suffer loss. The housekeeper may go on for years without a blaze in the house, but if she cannot act promptly and effectively when a blaze does occur she may lose her home. The teacher may go for years without a case of diphtheria in her classroom, but if such a case occurs and she fails to recognize the symptoms and act appropriately the consequences are disastrous. The bank teller may grow gray in service before he faces a robber at his window, but when that happens he must act appropriately if loss is to be avoided. That is, in preparing for vocation we must give heed to those situations which are neither typical nor frequent, but which are, if they arise, of *crucial significance*.

A fourth criterion but re-emphasizes selection in terms of the *future norm*. Among the practices of vocation are those which are standard and those which are better than standard. It is the latter that we should teach. The difficulty lies in determining which are the better. The safest basis for judgment lies in the study of trends. If under given conditions for a series of years an increasing number of successful workers is employing a new method, that is quite certainly a better method than the standard. This is the criterion of *proved superior merit*.

On the side of 'calling' in vocation a criterion of selection is to be found in the *interest of the learner*. Among the probable and significant situations we should as far as may be select for teaching purposes those which appeal to the learner because of the intrinsic satisfaction that he finds in meeting them or because of the questions that they raise in his mind. To help him in solving the problems that rise in his mind concerning his work is, perhaps, the best means to ensuring a content of insights and effective standards that will function toward self-realization in his calling. The criterion of interest, apart from mere 'motivation' in teaching, is a difficult one to use. But upon its successful use depends the effectiveness of preparation for a calling.

Now quite obviously such criteria are usable only within limits of teaching resources as set by environment and nature and experience of the pupil. Octavius Ray told the story of a swimming instructor who taught his pupils to swim by having them practice the strokes while balanced and sitting down on a piano stool. It did not work, of course. Nevertheless, assuming the absence of water and the object of swimming, the teacher used the best teaching situation available. If teaching resources be so limited as that the attempt at a rational preparation is well nigh useless. But they are limited and yet usable with effectiveness.

The United States maintains a naval training school on the great lakes. No warships are allowed on the lakes. Therefore the school cannot use a warship for training purposes. The next best thing, by using a steamship fitted and arranged to resemble a warship as closely as possible. The training given is by no means futile. The most appropriate method for learning to manage a dairy farm is to operate a dairy. But for students in our agricultural colleges and schools this is not a resource. They must be taught in situations that approximate the managing problems as closely as may be. The school uses the problems of the home farm, of actual farms, and the data of representative farms at a distance, selecting by type the best among its resources. The school teaches its students to operate on human cadavers, dead and living animals of a lower order than man. The surgeon does not operate on corpses nor on cats. The school is using most appropriately the resources that it has. It cannot grab men and women from the street that it may gain fully representative experience in removing gall bladders. Law students cannot try cases in court. They 'go through the motions' with fictitious cases. This is the *best use of teaching resources*.

A vocational school may be admirably located for its environment of actual vocation. But what it can do effectively will be limited by its schedule of teaching, if

ties of vocation vary with the season. Yet in other cases *seasonal opportunity* enters. A girl can be more effectively taught to can strawberries in June than in January. A prospective engineer can observe the dock loading of ore only while the lakes are open. The dramatic critic can follow the plays only through the theatrical season. An entomologist has few opportunities for effective field study in February, and so on. We should choose for teaching purposes in June what June allows us to teach effectively. If we can meet our pupils only in winter we must forego the use of many situations which a summer schedule would permit.

Formal preparation of adults for vocations may be organized to objectives that are inappropriate to adolescents. There are physical and moral risks in certain vocationally appropriate situations that forbid their use for the young. A school or course for miners or electricians may direct adults in experiences to which it could not admit a boy of fifteen. A school for police matrons and detectives might teach through direct participation grown men and women what it could not safely undertake with adolescent boys and girls. The factors of *physical and moral risk* to learners must enter in the choice of teaching objectives.

Obviously we should never attempt to teach a pupil what he is physically or mentally *incapable of learning*. This is not a problem with defectives only, but it is a matter of age, mentality, physique, and experience. Effective vocational and educational guidance will eliminate much of the difficulty, but not all. A pupil may find his opportunity in a given vocation and give every promise of profiting by a course of preparatory education. But there are often certain problems and jobs that as a beginner he cannot undertake. A boy perfectly capable of learning the swan dive should not undertake it till he has learned to swim. A prospective accountant should not be called upon to interpret a set of accounts till he has learned how books are kept. A prospective farmer of fourteen may better begin by planting corn than by running a four-horse cutter and

binder. According to the status of the pupil when he comes under charge of the teacher and the length of time that he will remain in his charge the content of the preparatory course will vary. Obvious as is the criterion, it is often overlooked in the planning of courses. The obsession that the 'subject' and the 'field' must be 'covered' no matter who the pupil or what the time allowed has led many to ignore the obvious.

SUMMARY ABSTRACT

1. The content of education preparatory to vocation is determined in the main by consideration of two factors:

- a. The contemplated product — an efficient and appreciative producer in a specific vocation.
- b. The material to be worked into that product — i.e. the learner as he now is in terms of aptitudes and abilities with reference to the prospective vocation.

Roughly speaking the function of vocational preparation is to make up the difference between what the learner now has of skill and understanding and what he must have to perform well and happily a particular service in economic society.

2. Again roughly speaking the general or ultimate aims of vocational education are:

- a. Every individual an efficient and appreciative producer in his chosen and appropriate vocation.
 - b. Every vocation, 'concern,' and industry an efficient organization of production and a wholesome medium for the individual producer.
 - c. The economic state organically efficient, stably integrated, and dynamically progressive.
3. Such aims imply the following generic objectives:
- a. A producer possessed of the will to do and to improve his work, and of the knowledge and skill appropriate to do so.
 - b. A producer who finds satisfying values in his work because he is intelligently aware of its meaning to him and to society.
 - c. A producer alertly responsible to those with whom he coöperates in production and to the consumer of the final product to which his work contributes.

4. No agency of education can prepare a learner for his chosen vocation in every conceivable detail. Limitations of time and resources make

necessary a selected rather than a complete content of vocational preparation both in general and in most particular cases. We must teach not all that is contributory to the aim, but rather what counts most toward the achievement of the aim. In simple repetitive vocations the calling aspects most need emphasis; in complex vocations of professional character the pursuit aspects. On the whole the social and dynamic significances of vocation need greater emphasis than it has been usual to give them.

5. A program of education preparatory to vocations should in its development give priority to vocations which touch most significantly the well-being of the many — e.g. medicine, teaching, agriculture.

6. The general schema of content in preparatory education for any vocation may be indicated thus:

Scientific and Technology	Productive	Institutional	Social-eco-
← of the	← art or tech- →	implications →	nomic back-
ground of the	nique of the	of the	ground of the
vocation	vocation	vocation	vocation

7. The first criteria of selection of content are *significance* and *probability*. Those situations in vocation the meeting of which successfully means most to society or to the producer and those productive situations which most probably the prospective worker will meet should obviously have first consideration in the selection of what should be taught to prepare anyone for his vocation.

8. Criteria of further selection are:

- a. *Type* — the use of situations which involve representative activities and have probable 'transfer value.'
- b. *Frequency* — the use of situations regularly or often occurring in the vocation, which involve activities that may be made habitual.
- c. *Crucial significance* — the use of situations not typical or frequently to be met, but such as must be met successfully if they do arise, if disaster is to be avoided.
- d. *Proved superior merit* — the use of situations involving activities of adaptation or methods of adjustment such as are indicated by the practices of known superior workers.
- e. *Interest* — the use of situations which appeal to the known interests of the learner.
- f. *Teaching opportunity* — the use of situations in accordance with the opportunities offered by season and location for effective teaching.
- g. *Physical or moral risk* — the avoidance of use of situations involving likelihood of physical or moral harm to the learner.
- h. *Capacity* — the use of situations which the learner is capable of learning to meet successfully.

CHAPTER XII

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. The proper place to prepare a hospital nurse for hospital service is in a hospital. What do you say? Could or should any part of her vocational preparation be carried on elsewhere? If so, what part and where else?

2. An administrator of a vocational school said: "It would help our teachers a great deal if they had authority to compel obedience in the way they could as officers during the war." Do you agree with him?

3. No pupil can learn a vocation except by meeting and solving problems typical of that vocation. What qualifications, if any, would you place on this statement?

THE 'PROBLEM IN A VOCATIONAL SETTING'

1. In ideal the method of education for vocation is education in vocation. The experience of the learner can be directed only by control of the situations to which he in learning responds. But the only features of any situation which the educator or teacher may with any certainty control are the sense stimuli of environment. If a teacher is to secure vocational responses from his pupils the teaching environment must be vocational.

Interpretation of the principle must be made with care. It does not imply, for example, as a few would have us think, that all the learning activities of the prospective carpenter must be carried on in a carpenter shop or in a building under construction; or that all the studies of the prospective 'kindergarten' must be carried on in a kindergarten. Productive activities, to say nothing of appreciative activities, are in vocation often carried on in surroundings quite apart from those

associated with the material product or the objective service. A carpenter can and does quite as effectively sketch a 'job,' figure a 'schedule,' or estimate costs at a table in a quiet room as at a bench in the shop. A kindergartner can and does read her Froebel and plan her work for the coming week in surroundings unlike those of the chair girdled circle. A farmer may 'balance rations' in the 'sitting room' after supper as well as in the barn before feeding. A lawyer may formulate his case in a Pullman car miles from a court room, a client, or an office boy. The physical and social surroundings of vocation are necessary for teaching purposes only when they furnish essential elements in a situation to which the teacher would have the pupil respond.

Such surroundings are essential most often to provide situations in which the direct labor of production is involved. The prospective carpenter cannot acquire skill in cutting a rafter while sitting at a desk in the classroom. The prospective 'kindergartner' cannot develop ease in dealing with five year old youngsters by writing an essay on 'occupations and gifts.' The farmer-to-be cannot learn the standard of quality in a dairy cow's skin from the textbook illustration. The embryo lawyer cannot acquire facility in examining a witness by poring over a tome of law. In all these cases an approximation to the actual environment of the job is clearly essential to successful teaching. Nevertheless, careful examination of the features of many vocations will reveal that there is no essential violation of the principle of vocational preparation in the use of classrooms and libraries and assigned readings.

2. The subjective features of teaching situations are, of course, quite as significant as the objective. That the 'kindergartner' in training should face her problems with the attitude and the motive of the 'kindergartner' in service is as significant for appropriate preparation as that she deal directly with little children. It is as desirable that the farmer in training should approach the problem of selecting a bull from the standpoint of economy in the dairy enterprise as that he should inspect and

handle bull calves. That the physician-to-be should play his part in the clinic with the same sense of responsibility as the practicing physician is certainly desirable. But to secure an approximation to the reality of vocation on the subjective side is much more difficult than to provide such approximation in the external features. On the whole, of course, the two go together. The most certain guarantee of appropriate subjective features is in providing the appropriate objective features. But the guarantee is not positive.

The 'problem method' often plays an important part in good vocational preparation. If anything distinguishes the work of the qualified teacher of vocation from that of the 'boss' employed in 'training' industrial workers it is the use of the problems of vocation as against 'following directions.' The first value of the problem is that it is representative of the actualities of many vocations. Many vocations consist very much in the solving of problems. That is of course true in the degree that the professional aspects of the vocation are dominant. In its unstable and uncontrolled situations every vocation brings in elements of novelty that call for adjustments not wholly in harmony with fixed habit. Hence a difficulty, alternative, or "fork in the road," which is the essential element in any problem.¹ Education in terms of the typical problems of vocation is the primary, if not the sole means to adaptiveness.

In the second place, the solving of a problem by the pupil calls for the "use of old things in new ways." The act of solving is for the pupil, if not for the teacher and others, an act of invention. All inventions that are not accidents are means or results of solving problems. Hence to establish in the learner an attitude favorable to invention and a habit of evaluating and using the data of experience intelligently in a novel situation, the problem method is useful. It is probably the sole method of education for inventiveness.

¹ Dewey: *How We Think*.

In the third place, since the problem method calls for pause and weighing of activities it contributes to the development of habits of critical open-mindedness. There is no way to teach a pupil to pause, examine, and criticize, except to have him pause, examine, and criticize in the process of his learning. Just that he must do in solving typical vocational problems.

4. The problem method of teaching, however, has its limitations. There has been a tendency to assume too much for the problem. It falls in with the prepossessions of those who proclaim that the sole aim of education is to 'teach pupils to think'; who assume that if only we cause the learner to think we thereby develop in him the 'power' to solve all the problems of life. But thinking, inventiveness, open-mindedness acquired in one kind of problem experience 'carry over' to another kind only to the degree that the same elements of connection are called for in the second kind. That the universality of these elements is what has been so often assumed is very doubtful. Experimental evidence and every-day experience point to decided limitations. It may be that the ability acquired in crossing the *pons asinorum* of Euclid helps the engineer in planning a bridge, but it is very doubtful that it helps the farmer in planning a rotation or the housewife in planning a budget. It is evident every day that the scientist is not at all necessarily a good thinker in business; that the wizard of mechanic invention is not a success in the invention of psychological tests; that the college professor is not always open-minded with respect to the problems of politics and religion. In the degree only that one problem overlaps another can we count upon transfer of acquirements in thinking ability. Since we do not know the extent of overlapping in any actual case it is well to be conservative — to choose problems in the light of specific requirements of vocation, and not to rely greatly upon the all embracing character of any of them. Thus vocational preparation may be kept free from the excessive radicalism of the 'fundamentalists' in education.

Every problem solution calls for a sequence and coördination

of specific abilities, some of which the learner already possesses and some of which he must acquire. The greater the scope of the problem the greater is the range of abilities involved and the greater is the complexity of the sequence and coördination of them. In so far as 'form,' or sequence and coördination, is generic to a group of problems, the use of several of that group may give sufficient repetition of the same responses to initiate or establish habits of thinking, planning, etc. appropriate to the solution of any problem in that group. For example, if a boy under teaching selects, plans, organizes, and carries through 'projects' in construction of a tool chest, a tool cabinet, and a chest of drawers, it is probable that he can undertake hopefully without guidance the construction of a china-closet. But if the problems selected are 'off type' the traits involved in their solution may be insufficiently exercised to make 'carry over' likely. For example, suppose that the boy made a neck-tie rack, a wheel-barrow, and a tool chest. It is doubtful that he would be ready to 'tackle on his own' either the making of a china-closet, a farm wagon, or a clothespole. There is the danger in this case, too, that actual interferences may be set up because of marked divergences in the details of the problems before the 'bond' sequences' of the several operations are sufficiently strong to be relied on. The same is true, of course, even more definitely when 'competing bonds' are strongly established by the use of contrasting types. A shift from one type of 'projects' in soft wood to a distinctly different type in hard wood may result in more mistakes on the part of experienced pupils than on the part of beginners.

In any 'chain' of activities for the achievement of a problem purpose, some links must be forged to a temporary holding strength, at least, before the chain can be completed. The boy who carries through either series of 'projects' mentioned above will have to stop for practice in certain details of operation before he can go on, e.g. setting a plane, laying off a corner, sharpening a chisel, etc. Moreover certain of the links that hold through the single problem are not strong enough to hold

in another. The boy above will hardly gain the carpenter's proficiency in sharpening edged tools by virtue of his completion of all six 'projects.' Out of these facts arises the need for 'practica' and 'drills' and observation and study. For the weakness of the problem as a sole method, obvious in the case of skills, is equally a weakness in the case of technical knowledge, standards, and so on. Some of the data needed in problem solution must be secured in advance of the attempt at solution; other data needed in vocation must be more strongly confirmed than the allotted problems provide. It must not be forgotten, too, that not all vocationally appropriate desires are those for material accomplishment. There are desires for insight and enjoyment apart from 'getting something done.' In theory the implications of any problem are sufficiently far reaching to develop whatever of skill and meaning may be needed, but actually there are few problems which even the best of teachers can so develop. A good teacher may centre his teaching in problems, but few teachers are capable of doing all necessary teaching through problems.

It is neither necessary nor desirable to lug in by the ears to a 'problem setting' all techniques and meanings of vocation. Indeed the habits of thinking, weighing, etc. are not objectives at all in many vocational situations. In the efficiency aspects of mechanic occupations that is particularly true. The tool operator and the machine tender should not face a problem in each successive operation. The response in meaning or action should be instant and without consideration of alternatives. A heel cutter who stopped to plan each placement of his leather or a carpenter who paused to consider each stroke of the hammer would not long persist in his vocation. If a simple situation arises frequently in vocation education should provide that response to it shall be through mechanic habituation rather than reflective thought.

SUMMARY ABSTRACT

1. In general vocation is the proper medium of education preparatory to vocation. Vocational preparation is education *in* vocation. The principle, however, needs intelligent interpretation.

2. Vocational motives in learning vocation are quite as important as the external stimuli of vocational environment. They are often difficult to establish as features of the learning situation.

3. The use of problems in vocational settings is one important mode of teaching vocation, because:

- a. In many vocations problem solving is characteristic of the activities of production and appreciation.
- b. Problem solving is probably the only method appropriate to development of attitudes and habits of invention.
- c. Problem solving inherently calls for pause, weighing, and selection — or contributes directly to development of attitudes and habits of critical open-mindedness.

4. Not all teaching preparatory to vocation can be or should be carried on through stimulation of problem activity. There are limitations in the problem method of teaching:

- a. Habits of reflective thinking developed in one field of problem solving do not spread to all fields. Only as problems are typical in character can we expect a 'spread of learning' from them to others faced by the worker. The limitations of mental discipline hold for thinking habits as for others.
- b. A problem successfully solved may provide insufficient exercise of certain traits necessary to its solution to leave them at functional strength for the meeting of new situations. Practice or drill in details must often supplement problem teaching.
- c. Neither the problem attitude nor the problem mode of attack is appropriate and desirable for the meeting of every situation of vocation.

CHAPTER XIII

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Specify three facts that a carpenter must know in order to set a studding; three that a printer must know to set the heading for a newspaper column; three that a housewife must know to buy material for a dress; three that a teacher must know to assign a lesson.

2. What is a fact? What is an essential fact?

3. Tom Jones uses an object to cut his meat. What is it? He uses an object to transfer the cut meat to his mouth. What is it? He uses an object to stir his coffee. What is it? He uses an object to pick his teeth. What is it? How many objects has he used?

4. Name three objects or events that you associate with each of the following: A Stillson wrench. A blackboard. A textbook. An emery wheel. Extracting a tooth. Sewing on a button. Outlining a brief. A printing press. A filing case.

5. Suppose that a girl is to be prepared to use a sewing machine, and that to do so she must know what a bobbin is. Which of the following methods of learning the meaning of a bobbin would you prefer to have her use?

a. Refer to the dictionary and write out the definition of bobbin.

b. Observe her teacher as the teacher takes out, fills, and replaces a bobbin.

c. Take out, fill, and replace a bobbin herself.

Why?

6. Suppose you wish to teach a boy that the boll weevil was introduced to the United States from Mexico. How would you teach him?

7. What is a good diagram, or a good picture, or a good description in teaching facts?

8. How would you determine whether or not a pupil had really learned the facts you tried to teach him?

TEACHING VOCATIONAL FACTS

1. The physician who diagnoses any case among his patients must first know the facts of the case — e.g. the pulse rate of the patient, his rate of respiration, his temperature. No com-

petent lawyer will accept or attempt to handle any case at law until he knows certain facts concerning it. 'Given the facts' the physician or lawyer is in position to act or render service, but not before. Some of the facts are very significant to success in understanding the case and in rendering service; others are of relative insignificance. So the facts that a patient is seventy-five years of age, has a pulse of one hundred and forty, and a temperature of one hundred and four are regarded by any physician as important facts in the diagnosis of his trouble, whereas the facts that the patient has just bought a new suit of clothes and that his eyes are blue are in the mind of the physician unimportant. To the lawyer the facts that his client has been in collision with a sedan while driving his runabout, that the sedan is caved in on the left side and the radiator of the runabout is jammed back a foot, that the client has driven a motor car for four days only and has no driver's license, are important facts, but that the client forgot to change his underwear this morning and wears gold cuff links is entirely without significance in determining what the lawyer shall do.

Every man who follows a vocation with efficiency and appreciation does so on the basis of knowledge of facts. He knows at least those facts that are essential to success in pursuit and calling. Certain data of reality condition every activity of production or understanding in every vocation. Without knowledge of them the producer can neither do nor value his job.

Such data may be either of things or of events. Knowledge of them we call knowledge of *facts*. Suppose a carpenter has received an order to construct a scaffolding. Before he can construct anything resembling a scaffolding it must be assumed that he knows the tools and materials which enter into its construction, not as names on a specification sheet merely, but as objects to be found in his shop or at the lumber yard. For instance, when he goes to select his tools for the job he cannot do so successfully if he does not recognize at once that

this is a cross-cut saw and not a plane, and that is a steel square and not a boomerang; when he goes to the lumber pile to pick out his materials he cannot do so with a prospect of success if he does not know that these are two-by-fours of hemlock at \$28.00 per M. and not six-by-fours of white pine at \$85.00 per M. If he knows that Joe Jones, the only teamster in town, has a sick horse and won't haul for anybody today he will not start the scaffolding today. Both his plans and his actions are as genuinely conditioned by a knowledge of the facts as to tools and materials as they are by his purpose to build a scaffolding.

2. All that is clear enough. In any vocation the realities outside us do condition our activities quite as surely as do our motives. Such realities as govern most frequently and most significantly our activities of production and understanding of vocation we must know in order to become in it efficient and appreciative producers. Those outside things and events which we must accept as data for the initiation and carrying through of any act of production we are accustomed to call the *facts* — 'the cold, hard facts,' which must be faced. But what is a fact and what is knowing a fact are not quite so clear.

If anyone doubts that the plain and useful word *fact* is hard to define let him consult any of the larger dictionaries and note the struggles of the lexicographer. Fact comes from the Latin participle *factum* — something done, made, or accomplished. More often we think of it as something that *is*, that exists whether we like it or not. Whether anything exists which was not done, made, or accomplished is a philosophical question with which we need not here concern ourselves. At any rate it is hard for most of us to conceive of facts in any other way than as things or events accomplished. So a cross-cut saw is something made, a board cut off is something done, a load of scantlings delivered in the yard is an accomplishment of someone.

Now this difficulty of conceiving facts except as things accomplished by man, by nature, or by God, is suggestive for the

educator. It suggests the process of learning facts. A fact for me and a fact for you is a fact only when we have become aware of it — only when it has a meaning and is not altogether apart from and outside us. That Joe Jones has a sick horse and refuses to haul lumber for John Scaife on November twenty-third A.D. 1925 is an important fact for Joe and John, but it is not an important fact to me, and it is not a fact at all to the queen of Holland. That this thing on the wall above the left end of the bench in John Scaife's shop is a cross-cut saw, seven teeth to the inch, is a fact for John, but it is not a fact for Tony Mantone, the barber at Stittsville, who never heard of John. his shop, or the saw.

How things and events come to have meaning for us, how we come to know them, is the subject of Doctor Dewey's classic chapter on Meaning in his book, *How We Think*. In brief a reality becomes of meaning to us only as we deal with it. Our knowledge of a fact is the residual effect upon us of what we have done with that fact, what we have made of it, what we have accomplished in having to do with it. A fact is, then, for him who knows it, something more than an external reality — it is an item in experience.

Take this thing of John Scaife's which we have called a cross-cut saw. What makes it a cross-cut saw to John Scaife or to anybody else? It is a cross-cut saw to John or to anybody else only when he has dealt with it as a tool for cutting lumber across the long way of the grain. To be sure one who has not dealt with it as such a tool might give the same name to the object, but the name would not stand for the same item in experience — the same knowledge of the fact.

Suppose, for example, that we place this tool in the hand successively of two boys, neither of whom has ever had to do with a saw before. Both will have the same experience of weight, shiny metal, serrated edge, wood at one end, etc. But let one boy take the saw down into the school shop and use it for cutting off boards to make a crate; let the other take it up into the music room and use it to make ravishing ca-

cophonies as instrumentalist in a jazz band. They will have dealt with the thing in quite different fashion, and it will have for them, the one and the other, quite different meaning. To the one cross-cut saw means a tool for cutting off boards; to the other an instrument for the production of delightful trilling squeals. The object or external reality remains the same in both cases; the thing known is quite different in both cases.

If by knowledge of certain facts in a vocation any two or any hundred persons are expected to guide their productive activities in the same way, then it is obvious that knowledge of those facts for all those persons should be essentially the same. For pupils learning the vocation the meaning must be not only the same for every pupil, but also as nearly as may be the very meaning that successful workers in the vocation find in the fact. A wise teacher of prospective carpenters would not teach the meaning of cross-cut saw by dividing his class into three squads one of which should saw lumber for construction purposes, another saw cord wood for the school stove, and the third play tunes on their saws at the school assembly. He would have them all saw the kind of lumber that the carpenter saws for the kind of purpose that is the carpenter's purpose. That for two reasons: first, that all might acquire essentially the same meaning for the saw; second, that the meaning acquired should be the meaning which the carpenter attaches to the object cross-cut saw.

Knowledge of facts is a matter of active acquirement just as is knowledge of principles or of techniques or any of the rest of what we learn for efficiency and appreciation in vocation; in effect, too, it is similar — it serves to guide the course of action and understanding in production of economic utilities. Accordingly the line between knowledge of fact and knowledge of principle, knowledge of fact and knowledge of technique, and the rest it is impossible to draw hard and fast. But teachers are in the habit of distinguishing roughly, and it is convenient for practical teaching purposes to do so. Roughly a

fact known implies a relatively simple experience with an external reality which does give or can be made to give the same meaning to all normal persons under the same circumstances. It is an experience which can be repeated if the same circumstances can be again provided; that is, as the common saying goes, facts are manifest or demonstrable realities. Thus the facts are manifest to every one of a thousand workers thronging into the gates of a factory that smoke is pouring from the stack, the hands of the clock on the factory tower point respectively to VII and to XII, and that the whistle is blowing; any normal man can demonstrate with three objects, a pine board, a saw horse, and a cross-cut saw, that a cross-cut saw is a tool for cutting off boards. There is no possibility of disagreement among sane men as to the actualities in either case. To some men the facts have large meaning, to others small, but the large and the small overlap in agreement upon the manifest and demonstrable facts.

Now for the teacher of vocational facts this argument implies two things: that the external facts of vocation which he desires to teach shall be the genuine facts, and that they shall be dealt with by his pupils in a manner and with a motive that are essentially those of the worker in the vocation to which they aspire. If the teacher succeeds in doing these two things he has done all that is possible to ensure that the pupils shall all have the same essential knowledge of the facts as vocational facts.

If every pupil having the need to use a cross-cut saw in order to construct something that he desires, or to repair a broken part, or merely to cut off a board for any reason whatever, should do no more than take the saw handed to him by the teacher and use it to cut off a board, he would learn that the object handed to him meant tool-to-cut-off-boards. But without other experience of the saw he might still be unable to pick such a cross-cut saw (i.e. one of seven teeth to the inch for cutting 'seven-eighths stuff') from a rack containing various cross-cut saws and rip saws. Undoubtedly when in need of a tool for cutting off a board he would go to the saw rack and not

to the chisel rack or nail box, but he would have to try one saw after another to discover which was the appropriate saw. Since the fact cross-cut saw plays a part in governing the activity of selecting a tool as well as in cutting off boards, it is clear that to get the carpenter's meaning of saw he would have to deal with the saw in still another fashion than sawing. For example, he might be stimulated to examine the saw with which he had cut the board, to count the teeth per inch, to note the set, angle, and bevel of the teeth, and then to choose from a rack of assorted saws one identical with that which he had used. By that means the saw would take on for him additional meaning of vocational character.

The illustration is used to suggest that one object or one event may represent in the mind of him who has dealt with it several facts, or aspects of the same fact, which must be known before the object or event shall have its full vocational significance as a datum. Objects and events in vocation, as elsewhere, do not exist in isolation. They exist in various environmental combinations. In the mind of the learner they are inevitably associated with their concomitants (the environmental features that go with them) and with the motive of the learner as he dealt with them. E.g. the saw so often referred to is associated not only with the environmental features boards, saw horse, work bench, saw dust, rasping sound, etc., but also with saw rack, long saws, short saws, coarse saws, fine saws, rip saws, etc. and the mind-set 'to choose the saw I need.' For the carpenter it is quite as important that the fact cross-cut saw be known in the second group of associations as in the first. The good teacher will see to it, then, that the pupil deals with it as examiner and selector as surely as that he deals with it as cutter of boards. In general terms the teacher who would have his pupils know the essential meaning of the data of reality which belong to the vocation to which they look forward will provide that they shall deal with those facts in their several appropriate vocational settings and in the several manners of the worker in vocation.

The probability that a man will guide his activities in a given vocational situation by knowledge of a fact of vocation previously acquired is roughly proportional to the likeness of the situation in which the fact is a present datum to that situation in which he learned the fact. Translated into a case that statement may be illustrated so: Assume that a full-fledged lawyer is confronted for the first time since entering his profession with the problem of examining title preparatory to passing of a warranty deed for a parcel of real estate. Assume that it is a fact that the law requires a filing of abstract of title with the register of deeds in such a case. The lawyer who learned that fact in connection with actual problems of title examination, as in serving as lawyer's clerk or apprentice, is far more likely to remember and observe the requirement of filing, than he who has learned of it merely through reading of the statutory provision in a text on real estate titles. The situation-activity of examining and recording titles under the direction of an employing lawyer is more like that which the new matriculant in the profession faces for the first time 'on his own' than is the situation-activity of reading about how titles are examined and recorded, in order to pass the bar examination. In plain language the man who has learned the job by doing it for another is more likely to succeed in doing it for himself than if he has 'learned to do the job' by doing another job, e.g. 'studying up to pass an examination.' Again, suppose a garage mechanic just entered upon employment in his vocation to face the problem of replacing a coil in a Ford truck. The first move in replacing the coil is to locate the coil box on the dash. If this mechanic has learned the location of the coil box in a Ford through first hand examination of the ignition system of a Ford touring car during a school practicum he is far more likely to find the box on the truck at once and without hesitation than if he had learned of its location an equally long time ago by hearing a lecture on the assembly of the Ford automobile. The situation-activity of finding and examining the coil box in Ford touring car No. 7654324 is more

like the situation-activity of finding the coil box to replace the coil on Ford truck No. 989898 than is the situation-activity of listening to Mr. O'Connor's statement that "you will always find the coil box on the dash in a Ford." The findings of psychologists point to the probable truth of these propositions. But any experienced teacher or observer will bear them out. We say that the first way of teaching the fact in each case is the more 'practical way,' meaning that the first is more likely to be effective than the second.

3. It is desirable, of course, that significant vocational facts be taught in useful associations in order that they may be used when the need arises. The more numerous such associations are, other things being equal, the more likely it is that the fact will 'stick by' or remain usably fresh in the mind of him who has learned it; the fewer the associations, other things being equal, the less likely it is to be remembered usably when needed. E.g. the boy who has used a cross-cut saw for cutting boards, has picked such a saw from the rack, has fitted, filed, and set such a saw, cleaned and oiled such a saw, and has bought one from the stock of a hardware dealer, is, after five days, five weeks, five months, or fifty years, less likely to make a mistake in choosing and using a cross-cut saw than one who has merely used it to cut off a board or two after the teacher had laid it out convenient to his hand. The first boy has had a 'fuller and richer experience' of the saw than is given by sawing only, he knows it better, or remembers it longer. The psychologist again supports our common sense belief that the more we know about anything the more likely we are to remember it.

But things are not always equal. The frequency and vividness of our dealings with a fact are quite as effective in fixing it as the number of associations we have with it. Indeed one and, perhaps, the chief reason why many associations tend to fix a fact is because many associations with it imply many dealings with it. But the well-known law of frequency is not the only factor in fixing knowledge. It seems to be true that

the more vividly or vigorously we deal with a fact the more likely it is to remain in our knowledge usably. There is difficulty, however, in determining what is vivid and vigorous dealing. Physical vigor is surely not at the basis. Sweating and rushing has no superiority over slow going attack — often the reverse seems to be true. Consider the case of examining the saw. How can one examination be more vivid or vigorous than another? Only in the sense that it is more attentive than the other. But all that we can mean by more attentive is that it is more satisfying. To be more satisfying it must be more in harmony with a purpose or desire, whether conscious or not. The vividness or vigor of our dealings with facts is, in general, if not always, determined by our motives in dealing with them — our motives, of course, being derived of our past experience. Thus a boy who examines a cross-cut saw because he wants to buy one like it for his tool kit may be said to deal with it more vividly, vigorously, attentively, purposefully, with more interest, with more satisfaction, with more care, more willingly — at all events more effectively so far as the acquirement of knowledge of it is concerned — than if he had examined it because the teacher told him to do so and his real motive lay in 'getting by' or pleasing the teacher. A higher degree of mental activity or a less distraction or competition among mental activities or both seems to be characteristic of those dealings with affairs which we call attentive, interested, purposeful, motivated, etc., and there is little doubt among psychologists or teachers that vigorous or vivid experiences leave a more lasting impress than those lacking in that somewhat mysterious quality.

A fact, then, learned in an appropriate vocational setting is longest retained as a useful determinant of vocational activity the more numerous its vocational associations, the more frequently it has been dealt with, and the more interested and attentive was the learner in his dealings with it. In general the more active the learning process the more effective it is.

4. All learning is, of course, active. But every teacher

recognizes that there are differences in the quality and quantity of activity called forth by different methods of teaching ostensibly the same facts. For example, suppose that it is important that a prospective surgeon should know the facts of number, shape, and position of the bones of the human wrist. One way of teaching those facts that is still in use here and there is this: The professor standing before the class says slowly and distinctly — “The joint of the human wrist, the carpus, is composed of eight small bones, *ossa carpi*, united by ligaments. They are disposed in two rows. They are closely bound together, but the arrangement and elasticity of the ligaments allow a certain amount of play between them. They afford origin by their palmar surface to the short muscles of the first and fifth phalanges or the thumb and little finger. They are named according to their form or size as follows:

First row (next the anterior extremity of the radius),

1. Scaphoid bone — boat shaped.
2. Semilunar bone — half-moon shaped.
3. Cuneiform bone — wedge shaped.
4. Pisiform bone — pea shaped.

Second row (basal to the metacarpals),

5. Trapezium bone — shaped like a trapezium.
6. Trapezoid bone — shaped like a trapezoid.
7. Os magnum — the large bone.
8. Unciform bone — hook shaped.

“The facts of the structure of the wrist are of the utmost importance. I shall expect you to memorize them.”

In the meantime the students write busily in their notebooks, ‘taking down the facts’ as stated by the professor word for word. As prospective surgeons every one of them recognizes that a knowledge of the facts of structure in the wrist may be a distinct professional asset and most of them are moved by a normal curiosity in the matter.

Given a similar group of students with like motives to learn-

ing the facts of structure in the human wrist, another method might be such as this: The professor assigns to each student the 'problem' of disassembling and reassembling the bones of the wrist of a skeleton arm, so that the final assembly shall be that of the normal wrist. If in doing so the student succeeds in the reassembly, or solves the 'problem' he will have done so by analyzing the situation into its essential elements of number, form, and position, on his own initiative. The process of learning the facts is far more active than in the first case, where the principal activity is in catching the words and holding them long enough to write them down without regard to any meaning that they may carry. Except with experienced anatomists who already knew the facts first hand the words would suggest nothing very close to the actual meanings anyway in the first case, but it is hardly to be doubted that the students in the second case would gather from their active examination the essential and intended meaning of the facts. In the one case they are passive receivers of names, in the other they are active discoverers of facts, and no teacher or psychologist will question the assertion that the second is vastly the more effective mode of learning the facts.

Now a combination of the two methods is not uncommon. Suppose the professor above were to give his little talk or dictation first, and then assign the problem. His view might well be, "I will give them the facts first, and then call on them to use those facts, so as to fix them firmly in mind." It would still be true that the students discovered the facts, by what he calls the use of them, but discovery, in process at least, is, of course, a sort of use. The only gain that might come from such a combination would be in some possible direction of attention to certain features more promptly than without the lecture would have been the case. Good teaching might use both methods, reversing the order. For example, the problem might be set first, the students given the names of the bones after they had disassembled the wrist, and the summary descriptive statement given by the professor after solution of the problem.

Even here a summary description and naming by each student 'on his own' would be a more active and efficacious summarization.

Perhaps use without discovery may be illustrated in this case by assuming that the professor demonstrates the disassembling of the wrist bones, showing each bone as he goes along, describing its shape and position, etc. as is sometimes done, and then sets the 'problem' of assembling the scattered bones in their original formation. He may be said, then, to have 'given' the facts, and to have attempted the fixing of those facts by calling on the students for active use of them. Roughly this is the sort of thing that teachers call 'applying knowledge.'

Again suppose that it is desirable that a prospective garage mechanic should know that there are tool marks on the angle iron in front of the fly-wheel and on the rim of the fly-wheel itself which may be used in timing the engine. If the student in undirected examination of the engine and in 'fiddling' with it hits upon the facts for himself there is no doubt that he will be more impressed by them than if he had merely read on page four of the instruction book that 'all manufacturers place a tool mark on the forward edge of the fly-wheel and a corresponding mark on the cross support in front of it as an aid to adjustment in timing the engine.'

Or the teacher may go to the car, lift up the hood, point out the tool marks and state their purpose, thus 'giving the student the facts.' He then calls upon the student to follow his directions in setting the tool mark on the wheel into proper position for the successive steps in timing, making all other adjustments himself. In this case the student has participated in the act of timing the engine — or has used the facts which he did not discover for himself. His dealings with them have been more active than if he had merely observed an assistant of the teacher in turning the fly-wheel to its proper position, or if he had merely 'sat in on' a blackboard lecture in which the teacher explained how the marks were used.

Or the student may be assigned the problem of timing an engine now misfiring, for which he has some present need, as in getting home, helping an acquaintance to get home, or merely the need to satisfy his desire to show that he 'can make the blame thing run.' In this case vigorous activities of discovery and use are likely to be called forth — activities of discovering facts, not only by examination of the engine, but also by inquiry, reading of the instruction book, and the like, and activities of using facts so discovered in making the several necessary adjustments in the engine, including the facts with regard to the tool marks mentioned.

As has been noticed activities of discovery directly for oneself are, in a sense, activities of use. So, too, activities of use in the real environment of facts to which attention has been called by picture, diagram, reading or telling by the teacher are, in a sense, activities of discovery, since for the first time the learner really comes upon the thing as it is. Nevertheless, a differentiation between discovery and use in learning facts is suggestive. In the combination of discovery and use to the accomplishment of a purpose contemplated before either, we find, probably, the most certain way of 'fixing facts in usable connections.' If a fact, or any set of closely related facts, is new to the learner and of great significance in vocation, the problem method calling for discovery and use of the facts is probably the most effective method.

5. But the process of discovery is often slow and costly. That has been notably demonstrated by those who use in science the method of unaided observation to which Agassiz attached so much significance. It is a method of prime value to the researcher in science. But it is not for the farmer, teacher, lawyer, mechanic, stenographer, or other follower of a vocation in which he must certainly deal in the main with facts already discovered and known by others, if time, materials, and the possible discouragement of the learner be taken into consideration. Probably very seldom, for example, even with earnest pupils set on a mastery of the job, would it be good

economy in teaching to adopt the method of Agassiz in teaching garage mechanics the parts of a four cylinder motor. Agassiz used to say, in effect, to a pupil: "Here is a creature (a flounder for example). Take it. Observe it carefully. Learn all you can about it." Then he would leave the pupil to his own devices. It is hardly likely that a teacher of motor mechanics would find it profitable to proceed in the fashion: "Here is a contraption (a Ford motor, for example). Observe it carefully. Do what you will with it, but find out all you can about it." And then retire to his office and light his pipe.

It would, on the contrary, conserve motor, time, and courage on the part of pupils were the teacher to stay by the job and assist materially in guiding the process of examination by questioning, criticism, and suggestion — or supervision of the study of the engine. So, for instance, the attention of the pupil may be directed to such facts as the mark on the fly-wheel, the position of the piston in the first cylinder and that of the inlet valve, when the marks and fly-wheel and cross support are in line, and so on — facts, which, if unguided, the pupil might spend discouraging hours or days in discovering for himself, and in the discovery of which he might do serious damage to the engine. A distinct saving of time and materials and a probable prevention of the subsidence of interest may often be effected by shortening the discovery of essential facts. There will be, in general, little loss in useful 'fixation' of such facts through such procedure on the part of the teacher, provided the situation demands active and appropriate use of the facts found under guidance. Thus, if the teacher above were to leave responsibility for timing the engine with the pupil once he has been led to the essential facts, and the pupil should succeed in using the facts so that the engine runs smoothly, it is probable that the pupil would be as well equipped with the facts as if he had pored and puzzled over the engine for hours to discover them. Time so saved by helping the pupil to the facts may be used for repetitive practice in making the adjustment, so that every essential fact is dealt with several times in

its proper associations. In a given time, then, the method of supervised purposeful exploration followed by purposeful use may be counted on to result in a more lasting usable knowledge of facts than the famous method of unaided puzzlement.

It has been noted previously that there are distinct economies in group as against individual teaching. Recognition of the factors of saving often justifies the teacher, even when teaching new and important facts, in demonstrating or showing his pupils the facts that he wishes them to learn. So, for example, the professor of anatomy may show to a class of prospective surgeons the bones of the human wrist, in enlarged model, as they lie together, and separately; the teacher of motor mechanics, standing by his engine in the center of a group may 'go over' the engine for them, pointing out the parts and movements of parts that he wishes them to know, and even, if he proposes also to teach the technique of timing, demonstrating the full procedure of adjustment till the engine runs with convincing smoothness; the teacher of agriculture may conduct a field trip to 'show' his class that alfalfa on one field grows taller and more thickly than on another; the teacher of home making may take her class to a house furnishing store to 'show' them a fireless cooker or an iceless ice chest; and so on. This is, of course, a method of directed observation somewhat less intimate than that previously suggested. It may, however, be very effective if the pupils have a real motive to knowing the facts — as in facing a problem to the solution of which knowledge of those facts is pertinent — and providing that observation be followed by more active dealings with those facts in use. For facts of minor importance such as have to be known, as it were for the time being only, till a principle is mastered, showing of objects and events by the teacher to the class may be a very useful and economical method of teaching facts.

6. Below showing of objects and events in degree of vividness of activity called forth in pupils is the method of depicting them in moving pictures, photographs, slides, sketches

and diagrams. In the degree that these approximate in form or motion the actualities, they are suggestive and valuable, not so much, perhaps, for teaching facts as for other teaching purposes. They are suggestive in high degree to the pupil who has already had experiences with real objects and events like those depicted, but has, perhaps, never centered his attention on the particular features to which the representation now draws his attention. So they cast back and enable the observing pupil to reconstruct past experience into a new form and thus become aware of new facts. In general, however, methods of depiction are far more effective in recalling facts already known than in teaching new facts. They serve excellently to summon to mind facts known and presently to be used.

Thus a diagram of an engine is without engine meaning to one who has never dealt with an engine as observer or user. For one who is familiar with one type of engine it may serve to bring out a fact of difference in another — e.g. as in showing facts of structure in a valve-in-head motor after experience with a motor having valves in offset chambers. Or a depiction may call attention to a feature in a familiar object or event which the observer has never noted particularly before — as when a photograph 'brings out' the position of a horse's legs in galloping.

A 'representation' which suggests nothing in the past experience of him who sees it is not a representation at all. But even when in elements and in composite it is largely novel and strange it may serve to stimulate a set of mind favorable to observation of particular features in the real object when it is met and recognized. Particularly in sketching and diagramming the possibilities of exaggeration and emphasis may effectively stimulate observation. It is told that a native of Manhattan once dropped in on an extension meeting for a moment just as the speaker completed a sketch of a cow's head showing the 'age rings' at the base of the horns. Later in visiting a farm he proved greatly curious, after making sure that the

creatures in the barn were cows and not dangerous, to examine the horns. He was delighted to find that some of them really showed rings.

For the teaching of new facts moving pictures and good still photographs are as close to the real thing as we can often get in depiction. But no teacher can count upon effective teaching of unfamiliar facts entirely by pictures. They are too far from actualities and the observer's manner of dealing with them too far from vocational in type. He gets a meaning for the picture, but it is not the meaning of the thing in vocation. Depiction is an excellent mode of teaching if it is made confirmatory of previous dealings with realities on the one hand, or suggestive of new dealings with realities on the other.

Activities in learning facts thus far considered represent in a rough way a descending scale of vividness in acquirement of meanings for the fixed data of reality in the vocational environment — those objects and events which are 'manifestly real.' The most vivid experience of meaning is found in self initiated exploration and use to the accomplishment of a purpose; the lowest in the scale in vividness are dealings with suggestive representations of the facts rather than with the facts themselves. Most teachers will agree, however, that thus far we have considered those modes of learning facts that are implied in what is commonly called 'objective teaching' as contrasted with methods of verbal information in teaching facts.

It is safe to say that methods of verbal information are much more prevalent among teachers of vocations, as among teachers working to other ends, than are the 'objective methods.' Lecturing and informal telling, assignment of readings, recitation, and discussion are, except in the teaching of certain mechanic trades and in parts of home making, stenography, agriculture, medicine, and a few others, much more relied on as means to teaching facts than are 'projects,' practica, observation studies and trips, and like methods of the so-called 'laboratory' type. A trend to increased use of the latter is reported

in law schools and is evident in teachers' colleges, but as yet in vocational education informational instruction is prevalent over more direct methods.

Now this state of affairs is by no means wholly due either to ignorance or inertia on the part of administrators and teachers. There are large areas of factual experience which are inaccessible directly to the use of pupils, particularly in the 'higher professions,' and there are many facts apart from those necessary to technical efficiency which it is impossible to deal with directly under conditions of schooling or otherwise. There are facts, too, which contribute to appreciation that require for their facing as 'manifest realities' an expenditure of time and effort far beyond the bounds of educational economy, since an approximation to the real meaning may be gained through substitute experiences under school conditions. Roughly such facts fall into two main categories: 1. Events or 'results' which have occurred and cannot be repeated. E.g. — that Guernsey cattle originated in the Island of Guernsey in the mild climate of the English Channel; that the Morrill Act establishing the agricultural colleges was passed during the administration of Abraham Lincoln; that Harvey's discovery of the circulation of the blood was published in 1628. 2. Events or 'results' which it is uneconomical to verify for purposes of teaching the facts: E.g. — that 90% of Chinese children of twelve years of age in the schools of Honolulu equal or exceed in school marks the median mark for children of the same age from Anglo-Saxon parentage; that a mile equals 1.6 kilometers; that Irish linen is subject to an import tax; that the weight of a standard rail is 40 pounds to the linear foot; and other demonstrable realities of the sort.

A trip for a year to the Island of Guernsey might verify the report that the climate is now mild, but would not make the fact manifestly real that Guernsey cattle originated there; a month in the business office of an agricultural college would make manifest that the provisions of the Morrill Act are now in operation, but not that the act was passed in 1862; a reading

of Harvey will make manifest that he did argue for a circulation of the blood, but not that he made his argument three hundred years ago. First hand dealing with those facts for learning purposes is impossible.

A trip to Hawaii and a statistical examination of school records would verify the facts as to the rating of Chinese twelve-year-olds; the laying off of a kilometer on a measured mile, with certain arithmetical calculations, would verify the statement of fact given; the purchase of linen by order from Belfast and the payment of a tax at New York would verify the fact of tariff; the weighing of foot sections of steel rails by a class of prospective engineers would prove the fact stated. But the time spent in such educative undertakings might better be spent otherwise. Not all facts can be taught 'objectively' or need to be taught 'objectively.'

Nevertheless it is a sound rule for teachers that all data of fact that are of very marked or frequent significance in vocation should, so far as possible, be learned by direct dealings with such data. In the case of data needed for efficient production the determination of what should be taught is largely possible; in the case of data of fact necessary to appreciation there can be much less certainty. But the teacher who makes the teaching of facts 'objective' so far as may be within the limitations of his time and teaching resources is 'playing safe.' Active dealing with real things is always an effective means to learning the meaning of them.

The importance of facts, as has been pointed out, lies in their status as conditions of behavior — of what we do, or feel, or think. The man who has a 'functional knowledge' of a fact behaves in a situation in which that fact is an element as if he 'knew the fact.' Now if through report or by description of an object or event the teacher can bring about an appropriate change of the pupil's behavior in face of the fact itself, then the functional value of the fact in education is accomplished, though the fact itself has not been dealt with in the preparatory learning process. So, if the teacher by verbal

instruction causes a pupil to 'believe' that sulphuric acid destroys the texture of cloth, the pupil may behave exactly as cautiously in using the acid as if he had come to his 'belief' by burning a hole in the sleeve of his best coat. Every teacher and parent realizes that teaching such facts by verbal instruction is difficult and uncertain. The 'burnt child,' in general, 'dreads the fire' very much more than the child who has been told, merely, no matter how often and how loudly, that he will burn himself if he touches the stove. But every teacher and parent realizes, also, that some very important facts cannot be taught by direct experience of them; that verbal instruction is neither always nor wholly futile. If that were not so many more thousands of our children would die yearly of poisoning than do so now. Susie can learn that the bottle marked with skull and crossbones is filled with undesirable pellets, without swallowing several of them to prove it, — even without a demonstration of suicide by father or the execution of the family cat. It is notable, however, that mother has not enough faith in telling to leave the bottle on the lower shelf; that the teacher of chemistry is not content with oral prescription, but locks up his phosphorus; that the teacher of prospective electricians is likely to turn on and turn off the current himself for a considerable period after oral cautioning has been given. When lack of knowledge of a fact is obviously and positively dangerous our trust in the spoken word and the written word is not so blind as in general and elsewhere it appears to be.

But faith in the tabular summary, the textbook, and the lecture for the 'presentation' of 'factual data,' is not altogether unjustified, even though we too often interpret the ability to repeat a verbal statement as evidence of knowledge of the fact — as witness the conclusions made from certain 'information tests' in agriculture and other fields. Tabular, textual, and lecture 'presentations' do often serve the purpose well. They do so, however, just and only in the degree that they revive or revive and reconstruct elements of previous experience with those who see and read and hear. They are

means of communication between teacher or text writer and pupil, and they are effective only as the two react to the same symbols in the same way — that is on the basis of common experience. Tables, texts, and teachers must ‘talk the pupils’ language.’ It may be a ‘manifest reality’ that “the olecranon is posterior to the coronoid,” or that “persis is a form of archil,” or that “in the . . . magneto one end of the primary is grounded and the other attached to the condenser plate,” or that “the median case and the modal case are in this case identical,” but many times such statements have no meaning, for those to whom they are addressed, in anywise resembling the meaning which the statement is assumed to convey. Wise vocational teachers do not use technical terminology with beginners, because they recognize that the beginner has no basis in experience to make such terminology intelligible. They see to it that the pupil acquires a first hand stock of meanings to which the technical terms may be attached before they depend upon such for suggesting facts. Most teachers and some text writers are careful in the “use of the difficult technical terms,” — such as tongue twisters from the Greek, for example, — but they sometimes forget that many words, phrases, and other symbols familiar to them are technical and foreign to their pupils. A student in architecture told a friend that “the prof used the words plinth and apse so often that I thought I’d better look ’em up before the prelim, and I’m sure glad I did.” A student attending a lecture on installation of household water systems came to the professor after the hour and said apologetically, “I didn’t want to interrupt you in your lecture, but I do wish you would show me what you mean by a ‘union’ under the sink.” Books — this book, for example, — and bulletins, particularly those on technical subjects, such as are most often used by students of vocation, often offend in that manner. The habit of the writer long familiar with the field of which he treats is so strong that he is unaware of the difficulties of his reader or that he is using anything but the plainest language, because it is so plain to him.

That is one reason why the 'popularizer' of a subject is so often more effective in his writings than is the author of a treatise or text; one reason that the research worker is so often a poor writer of bulletins for farmers; one reason that the teacher who is relatively new to the field in which he teaches is often more effective than the expert in that field. To talk with an audience is more effective than to talk at them. And the man who can talk with them is he who stands and looks at the new things from the ground on which his hearers stand. In short, if an object or event — factual datum — is not already known to the pupil, then objects or events like it must be known to him, before any verbal or symbolic presentation of that fact can be said to carry to him knowledge of it.

For teaching facts *new* as facts to the pupils verbal methods alone are extremely risky and uncertain — despite the prevalence of their use for the purpose. Their chief usefulness is in recalling experiences with objects and events to mind in order to develop from them understanding of principles and other forms of generalization. Such data recalled, of course, may be sufficient to start the solution of a problem in which new facts are discovered and used, or to start some less organic 'train of associations' that leads to knowledge of new facts. Put in another way, descriptions of facts which carry little meaning may be suggestive enough to direct attention to actualities not heretofore heeded. Thus, last year I read in a book on automobiles that the North East "distributor is of the flush segment type using a metal brush. The rotor is superimposed upon the timer cam both being driven by the same vertical shaft." That was not very informative to me. I remembered that my car had a North East ignition system — the advertising circular said so — and I knew where the distributor was. But if the statement was not informative it was stimulating. I went down to the car and spent two hours with that distributor — dealt with it variously. I came home to dinner with new knowledge of the facts of its construction.

The statement above reread tonight recalls the facts I learned quite clearly.

Statements of fact may be memorized and repeated at the pleasure of the teacher, if drill in repeating be sufficient — even after a rather long time. A pupil who is earnest and conscientious in his efforts to please his teacher may be “able to give every fact stated in yesterday’s lesson” without knowing one of the facts. Drill on facts to be remembered must be drill in the use of facts, not just drill in stating the facts, if it is to serve a useful vocational purpose. Knowledge of a fact is not knowledge if the fact be isolated from its proper associations. A fact to be known usefully must be used. If it is to be retained it must be used often and purposefully. Knowledge acquired by verbal suggestion is commonly much less vividly acquired than knowledge acquired through first hand dealings with facts. Hence the need for follow up in use of ‘facts taught verbally.’ A teacher saves no time — he wastes time — who ‘lades out the facts’ and requires only that they be ‘spooned back’ to him at examination time, or in tomorrow’s re-citation.

SUMMARY ABSTRACT

1. Facts are conditions of all vocational activity. Knowledge of certain facts is essential to efficiency or appreciation in any vocation.

2. A fact known is a fact dealt with. Facts dealt with in the same way by different persons have for them approximately the same meaning. The essential facts of a vocation must be known by all successful followers of it. In learning, then, all prospective workers in the vocation should deal with such facts as the producer deals with them and with the producer’s set of mind.

An object or event may have several meanings according to the way in which it is dealt with. If all these meanings are essential in vocation, then the prospective producer must deal with the fact in the several appropriate ways. Facts are not isolated but associated features of a situation. Accordingly they should be dealt with and learned in their vocational associations. Knowledge of one fact does not imply a consequent knowledge of another fact except as the two are alike or associated and dealt with in association or in like fashion.

3. Facts learned tend to be useably remembered very much in proportion:

- a. To the range of appropriate vocational associations with which they have been in learning bound.
- b. To the frequency with which they have been dealt with in a vocational situation.
- c. To the vividness of experience in dealing with them. Vividness of experience is conditioned largely by intensity of motive, immediate interest in activity, or satisfaction in the results of activity.

4. Facts are learned by an active process. But there are gradations of learning activity. Active discovery of facts, active use of them, or both are quite certainly more effective means to acquirement and retention of factual knowledge than are the relatively passive modes of perception commonly relied upon in teaching.

5. Learning facts through unguided exploration or use is often uncertain and nearly always slow. A supervised or guided and purposeful exploration is probably as effective as unaided discovery and is far more economical of teaching time and resources, if the facts brought to attention are appropriately used. Supervised discovery also fits well with the economies of group teaching.

6. Teaching of facts by suggestion of them, rather than through stimulation of actual dealings with them, is probably effective about in proportion as description or depiction recalls objects or events already dealt with by the pupil — i.e. in proportion as they are genuinely suggestive. Verbal information, pictures, diagrams may serve usefully to stimulate a set of mind favorable to dealing with facts presently to be used. There are cases, many of them, in which such indirect methods of teaching facts are the only possible and economical methods. In general, however, 'objective methods' of teaching are safer and sounder means to teaching knowledge of facts than are the descriptive methods.

CHAPTER XIV

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. State three principles and three standards that a properly qualified person among the following should know:

A housewife. A dairy farmer. A carpenter. A physician. A high school teacher. A banker.

2. What is a principle? A standard? Of what use is knowledge of principles and standards? What is a vocational standard?

3. Assuming that you had the obligation to teach a group of pupils one of the following, what would you seek first in the way of 'materials of instruction'? Choose one which you understand.

- a. The economy of good seed.
- b. The economy of good kitchen arrangement.
- c. The principle of contrast in advertising.
- d. The principle of paragraphing.
- e. The principle of 'balloon' construction.
- f. The principle of proportion in architectural design.
- g. The principle of rent.
- h. The principle of asepsis.

4. What does a man do when he analyzes a situation? What has he when he has made his analysis? Why is it that equally intelligent persons analyzing the same situation analyze it differently? What advantages are there in guiding a student in his analysis of a situation? What disadvantages?

5. Compare the following: A steam shovel and a sonata. A steam shovel and a sawmill. A steam shovel and a derrick. Or, a dairy cow and a statute law. A dairy cow and a laying hen. A dairy cow and a beef cow. Or, a silk stocking and a democrat. A silk stocking and a silk waist. A silk stocking and a woolen stocking. What is the basis of comparison in each case?

6. Contrast the following: A race horse and an ostrich. An ostrich and a heron. A heron and a duck. A duck and a goose. A goose and a gander. What is the basis of contrast in each case?

7. What criticism do you make of the following statements?

- a. Comparison and contrast are the poles of the same process.
- b. Comparison and contrast are means to analysis.
- c. Analysis is a means to comparison and contrast.

8. Can a man know a principle and not be able to use it?

9. Should a principle to be taught be stated? If so, by whom, and when?

10. Is the process of 'practice in the application of a principle' deductive from the principle or inductive to the principle? Is it analytical? Comparative? Contrastive? Is it a method of teaching or a method of testing the results of teaching?

TEACHING VOCATIONAL PRINCIPLES, LAWS, STANDARDS AND IDEALS

1. The real things which condition or limit the range of a worker's activities in his vocation — the hours, regulations, temperature, lighting, persons, plants, animals, prices, products, rooms, offices, materials, books, machines, implements, tools, etc., etc., that are outside him as a mind but are actualities of the trade, business, profession, concern, or industry in which he works, in short the data of his vocational environment — those things we have called the *facts* of vocation. Vocation consists, however, in what the worker does with those facts — his activities of labor and understanding in dealing with the realities. Both the worker and the facts are conditions of pursuit or calling.

On the outside are the facts, but in the mind of the worker more than factual knowledge acts to condition his efficiency and appreciation, — much more in the degree that as producer he is intelligent with respect to his producing. He knows beyond mere facts the relations of facts, and governs his activities by understanding of relations. The intelligent workman is not a mere sensible machine aware of what he does as he does it, but a forecaster and prophet who is aware of what he is going to do and why he is going to do it. He has, we say, knowledge of principles, laws, standards, and ideals; and acts in accord with them. To teach such vocational principles,

laws, standards, and ideals is a responsibility of the teacher who would educate any prospective worker to select, carry on, and find satisfying development in any vocation.

A fact as dealt with *per se* has a specific meaning. A fact as dealt with in relation to other facts takes on a larger meaning — a meaning that is *general* to the extent that it enriches the meaning of other facts. Since no fact can be dealt with wholly by itself it follows that no knowledge of a fact can ever be simply and only specific and without reference to anything else. For that reason it is impossible to draw a hard and fast line between factual knowledge and knowledge of generalizations, or to say accurately that we are now teaching facts, now principles. The distinction is relative only, but is worth while because it helps the teacher to shift the emphasis of his teaching according to the scope of knowledge that he purposes to develop.

Generalizations, of an intellectual kind at least, may be classified as principles, laws, standards, and ideals. These four are of the same genus, but of slightly different species. They mean much the same, but not quite the same. From the standpoint of method, however, they can be treated as one. All, in learning, must be derived from and include more than particular given experiences.

A principle may be defined as a conscious belief that exercises a directing influence upon our dealings with various particular situations. If John Smith, having succeeded in timing Ford engine No. 3773461 now goes in turn to Fordson No. 347654, Buick No. 876543, Hupmobile No. 435654, Packard No. 234432, and times each engine successfully, we say, without hesitation, that he has learned the principle of timing in the automobile engine. If Sadie Jones, an 'apprentice teacher' of Home Economics, has made successful problem assignments in a lesson in bread making, a lesson in meal planning, and a lesson in shirt waist making with one class of high school 'freshmen,' and then, unguided, undertakes successfully problem assignment for sophomores in Nutrition, juniors in Dress

Design, and seniors in Household Management, we credit her with knowledge of the principle of problem assignment. In either illustration the individual has been guided in his or her dealings with particular cases, not identical, by understanding of meanings not confined to one case but common to all.

The illustrations given involve dealing with cases alike in some details and different in others — that is, situations having some common elements but not all elements common. I.e. — Ford, Fordson, Buick, etc. all are gasoline motors, all have cylinders, pistons, valves, flywheels, spark plugs, coils, but in size, form, number, assembly, etc., the parts and the wholes are variously different. Sadie Jones' cases are all alike in that the pupils are girls, girls in a school laboratory, girls in Home Economics, etc., but different in that the girls are of different ages and different experiences and interests; in that the 'lesson aims' are unlike; and so on.

Now suppose that Jake Hansen's job is to lift milk cans from one truck after another as it backs up to the platform on which he stands and to place them on a carrier that takes them to the washing room of the 'milk plant.' Having lifted and deposited cans 1, 2, 3, 4, 5, 6, 7, 8, 9 successfully he makes no attempt to lift a truck tire, a blanket, or a driver to the carrier, but deals successfully with cans 10, 11 . . . 83, 84, . . . 270, 271, and the rest. Shall we say that he has mastered the principle of selecting milk cans out of the cosmos? Every successive 'forty quart rattler' he looks at and handles is a specific and particular datum of reality. Between cans are readily discernible differences in odor, denting, stains, tags, number plates, initials, so that, for example, the cans belonging to the Hillside Dairy Farm may be instantly picked out, and among them the old cans easily distinguished from the new ones. Or shall we say that Jake is not guided in his successive recognitions of can after can and proper dealings with them by any principle, but by knowledge of the fact? The psychologist might well answer the first question, 'Yes,' and the second, 'No,' saying that a concept governed action with the lifter of cans as surely

as it did with John Smith and Sadie Jones aforementioned. It is possible that most teachers would answer, 'No,' to the first question, and 'Yes,' to the second. They would say that Jake is not in his can lifting conscious of how or why can is like can; that very likely he never has been so, and that there is nothing in the job of handling cans demanding that he should be so. He is acting in terms of an acquired knowledge of facts, but never, even at the beginning, in terms of a conscious use of principle. There are, of course, possibilities for the development of consciousness of principles in lifting cans, placing cans, and so on, but they are not known by Jake or necessary in the job described.

These questions are introduced not as a puzzle, but to make explicit the difficulty of delimiting the levels of learning. From the social or efficiency standpoint it makes no difference whether Jake governs his can movings (1) in the light of a conscious judgment, (2) in terms of a principle once clearly perceived but later lost from sight in the development of automatic habit, (3) by conscious recognition of can by can, or (4) by initial recognition and later automatized habit, so long as he acts correctly in the matter and moves the cans promptly. With John Smith and Sadie Jones again, from the same standpoint, it makes no difference whether they are or have been conscious of principle so long as they accomplish the timing and the assignment making properly. It is difficult, however, to believe, in these latter two cases, that the workers could ever develop such efficiency, lacking, in the initial stages at least, guidance of their doings by principles consciously recognized. In all three cases, of course, no contribution to inner life can come from a mere habit in conformity with principle; but some may well come from the conscious knowledge and use of principle — that is, in seeing what one is doing and what one is going to do and doing both deliberately. The method to be used by the teacher who directs the learning of a prospective producer will vary as he desires that the worker shall become aware of principle or not.

Webster defines a law as "a statement of an order or relation of phenomena which so far as known, is invariable under the given conditions." It is a principle made explicit by diagnosis of the elements common to all situations in which the order or relation holds; or by prognosis of the order or relation when the discovered combination of elements shall occur. E.g. — Charles' Law is: All gases expand or contract equally for equal changes of temperature. Boyle's Law is: The volume of a gas is inversely proportional to the pressure. Neither law is a final statement of the truth, but each is an explicit statement of a principle often tested in carefully controlled experiments. Each enables the engineer or physicist or anyone else who understands the law to predict the behavior of gases when certain conditions occur, or, when gases behave in a certain fashion, to cast back accurately to the conditions accounting for the behavior. Not all principles that can be stated with greater or less explicitness deserve the name of laws. Usage is to limit the term to explicit statements of principles that have been 'verified' or 'tested' under carefully controlled conditions. In consequence laws are more frequently to be found in the 'exact sciences,' such as physics or chemistry, than in other fields. But we do have in less exact sciences, such as psychology and economics, explicit statements of principle that are called laws. E.g. — "The laws of exercise and effect" in psychology, and the 'law of diminishing returns' in economics. In many vocations knowledge of such laws is a distinct asset to efficiency and to appreciation. The vocations of engineering and chemistry call for knowledge of the laws of Charles and of Boyle; those of teaching and school administration for knowledge of the "laws of exercise and effect"; those of entrepreneur or manager in many fields of agriculture and industry for knowledge of the 'law of diminishing returns'; and so on.

When one has in mind a pattern of a process or a model of a product by which he measures processes of a kind or products of a kind (i.e. in which the same principle is involved) he is

said to have a standard by which to judge. Thus a teacher in rating his pupils for efficiency in carpentry uses standards of speed and deftness in manipulation, form and finish, to arrive at a judgment. Edward Brown he judges to be slow and inaccurate and refuses to give him a passing grade; Hyman Mancovitz he finds speedy and accurate, and passes him with a grade of 95%. But, of course, Edward has some speed and some accuracy if he produces anything at all. He is a low grade pupil in carpentry and Hyman a high grade pupil not by reference only of the work of the one to the work of the other, but by reference of the work of either to a standard of proficiency in the mind of the teacher. All teachers in rating pupils, all persons in judging of the relative value of objects or events, their own doings or the doings of others, use standards.

But the carpenter's trade has standards of workmanship, the vocation of teacher of carpentry has standards of proficiency for pupils by which they are adjudged fit or unfit to enter the trade of carpentry. The standards of vocation, then, are not purely individual. A trade or profession has standards when its members have in mind and use the same patterns of process, models of product, criteria of loyalty, tests of honorable dealing, and the like. The teacher of vocation is, obviously, concerned with the development in his pupils of vocational as well as personal standards.

Now a standard, no matter whether it be called vocational or personal, is always a possession of the individual. He is the one who uses it. But he has use for it only when he has to deal with facts of a kind but different. A foot rule is no standard by which to compare a pine board, a flavor in soup, and the accomplishment of a pupil in adding two column figures — those things are not of a kind and comparable. A No. 8 chilled shot pellet will serve no purpose in judging the size, weight, shape, and color of a thousand pellets from the same bag of shot — the things are all of a kind, but not different. Hence a standard in mind is very much the same thing as a principle. It is a principle used for comparing and measuring.

An ideal is a standard not yet achieved by him who holds it. Thus for a girl learning design an actual drawing by her teacher or a skilled designer may as perceived serve as an ideal. The standard of the skilled workman may serve as an ideal for the apprentice. In either case an easily achievable standard for the vocation may be something toward which to strive for the learner in vocation.

The statement 'something toward which to strive' suggests the function of ideals in conditioning activity. The ideal may be figured as a sort of hunger spot in the mind toward the filling of which activity is directed. The intellectually conceived ideal is also a standard against which we measure the results of our attempts to meet situations of a kind, judging them as relative successes or relative failures in the degree that they approximate to the ideal. Thus, like standards, they are sources of satisfaction and dissatisfaction. But since the ideal as ideal is unattained or unattainable there remains always a residuum of hunger—the 'divine discontent' that urges always to further achievement. The directing motives of rational progress in vocational institutions and of growth in individual efficiency and understanding of vocation are found in ideals.

An illustration in point is the ideal of the draft horse conceived by the breeder of horses. No animal exists which possesses all the attributes of size, weight, conformation, soundness, disposition, gait, etc. which satisfy the breeder. But an ideal of such an animal, a concept built up from his experience with draft horses, does exist in the mind of the breeder. It serves on the one hand to direct his selection of dam and sire and in the evaluation of their progeny; it serves on the other hand to keep him forever discontent with his successes and seeking for further improvement. Again suppose a hotel keeper to have in mind an ideal of comfort and restfulness in the rooms provided for his guests. By it he is guided in the construction, furnishing, and arrangement of his rooms; by it he judges of the worth of the adjustments he has made and

the suggestions that come to him for such adjustments; by it he is kept seeking for new and more satisfying modes of construction, furnishing, lighting, ventilation, etc. Thus his hotel is not only relatively a place of comfort and rest, but at every opportunity that his resources afford becomes more so. With change the strain of draft horses, where the breeder is guided by an ideal, tends to become more serviceable — that is, the breeding more efficient — and each success in approach to the ideal enlarges the enjoyment of his calling by the hotel keeper.

Now, of course, the ideals of appreciation and those of efficiency may conflict. The perfect draft horse in the mind of the breeder may be such a horse as no user of horses may find it profitable to own; the perfect hotel room, as the hotel keeper sees it, may be such a room as few guests would care to occupy. Hence the need for guided development of vocational ideals. Most men have ideals. But their ideals are not always those which lead to improvement of their vocational serviceability.

The bricklayer who reduces his daily production of laid bricks from two thousand to one thousand while his pay advances from four dollars to twelve may do so because he is moved by an ideal. It may be the not uncommon ideal that the perfect job is that which yields large pay for no work; or it may be the ideal of obligation to increase the number of openings in his trade, so that every bricklayer may find constant employment at high wages. The first we should call an unworthy and selfish ideal; the second an unselfish but mistaken ideal. In either case success in reducing labor and increasing wages makes the job more worth while as a calling, perhaps, but distinctly less valuable to society as a pursuit. So false ideals may lead the members of a trade, business, or profession to increasing satisfaction in inefficiency. That such ideals do exist — they are openly and loudly preached at times — and that they influence production to the detriment of the welfare of the many is amply evident in the history of

the past ten years, or any other ten years for that matter. Ideals of service, in particular, need enlarged emphasis in vocational education.

Principles, laws, standards, and ideals are 'governing concepts' in behavior. They stand for the common elements of meaning in varied particular experiences, and determine the manner of our reaction to new situations which resemble in features those which we have met before. Accordingly they become of significance in preparation for vocation very much in the degree that the conditions of vocation are unstable and variable. In any given vocation, then, understanding of principles, laws, standards, and ideals conditions efficiency in the professional phases of that vocation. So in law, teaching, medicine, engineering, agriculture, efficient production in their several vocations is largely conditioned by knowledge of principles, laws, standards, and ideals; whereas in machine tending and simple repetitive hand labor pursuits such play a small part relatively in determining quantity and quality of product. On the other hand, as has been noted, there is a distinct correlation between the scope of meaning which we find in a particular experience and our valuing of it. It has been noted, too, that the function of the conscious recognition of relations is to enlarge the meaning of particular dealings with objects and events. On that ground the teaching of principles, laws, standards, and ideals becomes desirable apart from all requirements of efficiency, in enlarging the scope of life on the job and in making mechanic repetition itself of some value to the worker — in short to promote the realization of calling in pursuit.

For vocations as they are, then, there is need of understanding generalizations. If vocations are to progress as institutions and the worker is to grow as an individual in his vocation the pupil in preparation must be developed not only as flexibly adaptive to changes in environment as they occur, but consciously to forecast and determine his part in the creation of changes. For flexible adaptiveness the mode of preparation is teaching of principles and laws; for forecast and creative control

of vocational environment the mode of preparation is teaching of standards and ideals. Before a man can take an intelligent part in creation of a change for the better he must be aware of the standards of the present and have in mind a standard for the future — an ideal.

Perhaps few educators and teachers need to be reminded in such fashion of the importance of principles and ideals as objectives in teaching. Most of us are 'strong for them.' 'Practical men who demand results,' however, have more than once decried the teaching of principles. As one man put it several years ago in addressing a meeting of teachers: "If they (the pupils) can do it, it's none of your business whether they know how they did it or why they did it. Your job as teachers is to see that they can do the job. Paste that in your hat and look at it when you want practical advice." There are those among teachers who, under pressure of an ignorant demand for practicality, teach chiefly by rote direction and unleavened drill, to the neglect of adaptiveness and appreciation. Such teachers are machine operators, operating the pupil machine. The teaching of principle and ideal is not all of teaching, but from both the psychological and the sociological viewpoints it is, in preparation for trade, business, or profession, perhaps the most largely significant part of teaching.

2. Psychologists are not in agreement as to the ultimate nature of the process of generalization in the mind. It has long been accepted that the mode of learning is that so clearly described by William James — the abstraction from variant cases of a kind of the elements of similarity; but Professor Dewey rejects this view, and many accept his explanation in its stead. Dewey regards the process as one of infolding of the new experience in the cloak of the old rather than as a peeling off of differences to reveal the common likeness — a process of composition rather than of abstraction. Now analysis of the new may be synthesis with the old; comparison of one case with another may be really composition of one case with another; contrast of case with case may be synthetic composition.

But, so far as the implications of either abstraction or infolding bear upon what the teacher shall do in the direction of pupil experience to the acquirement of principles, laws, standards, or ideals, there is no readily discoverable difference. The teacher is justified under either theory in basing his procedures on the assumption that somehow (1) by attentive examination of a particular case, (2) by similarity in experience of variant cases, (3) by unlike experience of dissimilar cases, or by any and all of such modes the learner does arrive at generalizations. This is what is meant by the familiar statement that we arrive at understanding of principles by means of analysis, comparison, and contrast of items in experience, or what we have called here cases.

To initiate or develop with his pupil, then, understanding of any principle, law, standard, or ideal, the teacher must provide that the pupil shall deal with a case or cases in which the relation of fact with fact is perceptible, and deal somehow with the facts of the case in the relation which is to be perceived. To illustrate, assume that *a* stands for a generalization to be developed, then *b* is implied:

a. The relations of cement, sand, and coarse aggregate — or a principle in the mixing of concrete.

b. A case or cases of mixing cement, sand, and coarse aggregate to the making of concrete.

a. The relation of digestible protein in the ration to the growth of young animals or human beings.

b. A case or cases of feeding digestible protein to young animals or children.

a. The relation of application of heat to the preservation of foods — the principle of sterilization.

b. A case or cases of sterilization of food by heat.

a. Law of the cycles in a gas engine.

b. A case or cases of related valve, spark, and piston operation.

a. Law of expansion in metals.

b. A case or cases of change in volume with change in temperature in a metal or metals.

a. Law of diminishing returns from land.

b. A case or cases of diminishing return per unit of applied labor, expenditure, manure, water, etc.

a. Relation of demand and supply to the exchange value of utilities.

b. A case or cases of change in relative values with changed relations of supply and demand.

a. Standard of finish in a paint job.

b. A case or cases of approved standard finish in painting.

a. A standard of weave in cotton textiles.

b. A case or cases of approved standard weave in cotton cloth.

a. A standard of output per worker in men's shoes.

b. A case or cases of efficient factory output of men's shoes.

Since an ideal, as a concept of unachieved perfection, may not always be represented in any specific case, the learner cannot always deal with a case involving the ideal. In practice, however, he must, to acquire the ideal, deal with cases in which the existent standard approaches it. E.g. —

a. An ideal of economy in heating houses.

b. A case or cases of economically heated houses.

a. An ideal of conformation in beef cattle.

b. A case or cases of excellence in conformation in beef animals.

a. An ideal of beauty in woman's dress.

b. A case or cases of woman beautifully dressed.

a. An ideal of honorable dealing in the sale of merchandise.

b. A case or cases of approved honorable dealing in the sale of merchandise.

In short the first undertaking of the teacher who would teach a principle, law, standard, or ideal is to seek out 'examples'

of it. Those examples may be found either in the past experience of the pupil or in a new experience provided by the teacher for him.

Analysis

3. To become aware of a principle through study of a single case is, in the practical sense at least, possible. As the first step in initiating development of understanding of principle 'analytical examination of a type case' is a widely used and very useful mode of learning under guidance to generalize. 'Analysis' consists virtually in picking out certain features of the case, or elements in the situation, and combining them in some significant relation, or composing them into a new whole. Which of the features the learner will pick out, or which elements, as Professor Thorndike puts it, will be "prepotent" in determining the nature of his response, and how he will put them together depends both upon (1) his present set of mind or attitude in the situation, and (2) his past experience with such elements and features.

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In any situation the factual aspects are likely to be many, but they are not of equal significance to the discovery of the principle to be developed. Thus the factual aspects are many in any mixing of concrete, e.g. the brand names on the cement sacks, the color of the cement, the color of the sand, the color of the aggregate, the noise of the mixing, the temperature of the water, the amount of the aggregate, the character of the aggregate, the amount of sand, the shape of the particles of the sand, the amount of water, the amount of cement, the distribution of the cement and water over surfaces of the aggregate particles, the odor of the wet mass, etc., etc. But for understanding of the quantitative relations of cement, sand, and coarse aggregate not all of these are significant. Analytical

study that results in awareness of the principle must focus attention upon such features as the amounts and character of cement, sand, and coarse aggregate, and to the combination of these in a perceived relationship without reference to the facts of rattle and clank, odor, temperature of water, etc.

To 'turn a student loose' to examine and discover as he will, without careful heed to the character of his past experience or the present set of his mind, is a method that has its backers, but that is unquestionably expensive of time and effort and quite uncertain to give the results in properly focused attention upon which analysis for the discovery of principle rests. So, for example, a student turned loose to 'fool with' a Ford engine may operate it for months without discovering the principle of the cycle. He may either miss the essential features entirely because his attention is given to other things about the engine, or fail to put those features together in the cycle relationship. Even such apparently obvious features as the lessening additions in yield per inch of water applied to irrigated lands, when the applications are increased beyond a certain point, are often missed by students 'given selected data' of a case to suggest the principle. They note the successive figures as increasingly large and come back with the perfectly justifiable report that the principle in the case is "the more water you apply the larger yield you get." It is an old joke that farm boys and girls can often not tell which legs a horse bends first when he lies down. They have observed the performance often, but have never attended to the feature in point.

It is probably very rarely indeed that a pupil unguided really discovers a principle wholly from examination of a single case. If he appears to do so inquiry will reveal, ninety-nine times in a hundred, that he has dealt with like cases before. Because of that experience certain features in the present case tend to stand out, which in this case for the first time fall into their proper relation, so that the relation formerly not perceived is noted as a character in the case. So a girl, studying a record

of the weights of a growing child fed upon milk, notes, because of her previous studies of milk, meat, eggs and so on, that milk contains considerable protein, and remembering from her past experience that all babies feed on milk, may suddenly hit upon the suggestion that a relation exists between protein in feed and the growth of the body.

It seems to be true that discovery of a principle, law, or standard 'for oneself' is more effective in learning than mere perception of it when it is 'pointed out' by another. It is a trait in man, almost universal and not easily smothered by education, to find greater satisfaction in his own achievements than in achievements gained by following another person. As everyone, even the most convention ridden adult, knows, it is far more pleasing to solve a puzzle or guess a riddle than to have someone 'show you how' or hint broadly at the answer. This factor of satisfaction in self-initiated activity and achievement is potent in the fixation of learning. Accordingly it is very desirable that the teacher who seeks to initiate understanding of a principle through study of a type case should preserve on the part of the pupil the feeling that he is discoverer and not a mere witness of rediscovery.

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At this point the teacher faces something of a dilemma. If he adopts the method of Agassiz the pupil who succeeds in discovery of the principle will have the maximum of satisfaction in his discovery to make for impress of it in his understanding. But if the case be of a relatively new sort in the experience of the pupil that method consumes much time and results in failure many times. On the other hand if the teacher adopts the method of 'pointing out' in the case chosen exactly the features which ought to be noted and the relation pattern into which they fall, — as, for example, in the common type of demonstration-lecture — he does save time to be sure, but in

making of the pupil a relatively passive follower instead of an active explorer he sacrifices both the immediate factor of satisfaction on the part of the pupil and an opportunity for contributing to the general attitude and habit of resourceful initiative in the pupil. As a rule, then, the teacher should seek a compromise in a mode of procedure sufficiently suggestive to focus attention at the proper points without so great explicitness as to make the pupil aware that he is following and not pushing ahead on his own responsibility.

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This thing has happened now three times, so that perhaps the reader, at first annoyed by an apparent manifestation of the ETAOIN-shrdlu complex on the part of the printer, has examined the composition somewhat attentively. If so, he will not be altogether displeased with himself if he can answer, without further reference to the letter spasm, a fair proportion of the following questions.

1. What message of caution is contained in the composition?
2. In what language is it worded?
3. From what author is it quoted?
4. Into how many blocks are the letters divided?
5. How many of the block division symbols are the same?
6. What words occur in English in the several blocks?
7. What block or blocks contain no English words?
8. What Latin words occur in the successive blocks?
9. Which blocks contain more than one Latin word?
10. Which words in order make sense?
11. How many letters and symbols in the whole composition?
12. How many letters of the alphabet appear?
13. How many times does each letter appear?
14. What is the proportion of consonants to vowels?
15. What letters occur in every block?
16. What letter occurs three times in one block?

17. What syllables are repeated?
18. What boys' names or nicknames appear?
19. What terms applicable to women appear?
20. What letters or syllables designating chemical elements appear?

Most readers will find that the questions tend to focus their attention (by changing their mind-set) upon features which their unguided attention overlooked. Most will recognize the influence of past experience (as in reading Vergil or not reading Vergil) in determining which elements they have noted. Most will recognize a distinct difference in satisfaction with the things which they have picked out and combined for themselves as against those made under direct suggestion by the questions. Perhaps, too, most will find greater satisfaction in having answered by virtue of unguided exploration question No. 1 than question No. 18.

Rather curiously the methods of unaided exploration and of complete showing or telling are most likely to be effective when the experience status of the pupil is the same. If a pupil has had experience of many cases like to that now dealt with he is most likely by unaided examination to come to clear perception of the principle involved. This because of elements made "prepotent" by repetition in experience. So, a group of experienced mechanics in school for 'part-time instruction' are more likely to hit upon a principle in curious examination of a new machine than is a group of inexperienced boys of equal native intelligence. Twenty boys from the farm as compared with twenty city boys of like age and schooling are more likely to discover in study of records of an efficient farm the principle of 'production per man.' By the same token, as every teacher knows, the group of experienced mechanics will profit more from a showing-telling lesson on the principle of gear ratios than will the inexperienced boys; the group of farm boys will profit more from a blackboard lecture on the principle of the four-horse hitch than will the city boys. That is because the showing-telling serves largely to recall to notice features already

observed, and to make explicit patterns of relation already implicit in the experience of the first group; and because it cannot recall to notice what has never been observed by the second group nor make explicit what is not implicit in their experience. In the same way, case lectures to physicians in diagnosis, to lawyers in equity, to engineers in thermodynamics, to home-keepers in household budgeting, to mothers on habit formation in children, are more likely to be effective in the teaching of principles than are such lectures to college undergraduates in medicine, in law, in engineering, or to high school girls in the Home Economics course.

Before choosing his method the teacher should know quite definitely the range and kind of experience that the pupil has had with cases involving the features and relations he wishes 'to bring out.' If the pupil's experience provides a strong foundation, either method mentioned — unaided exploration, and showing-telling — may be fairly relied on to enable the pupil to perceive the principle. Choice between them will be determined by the importance of the principle in the education of the pupil. If it is of great importance, then the slower method should be chosen because of the 'stronger fixation' that comes of active exploration and successful discovery; if the importance be minor, as for example in guiding laboratory technique where the result and not the technique is sought by the teacher, then showing-telling may be the economical method.

In most instances, however, the teacher faces two conditions. He must in a limited time initiate understanding of a good many important principles, laws, or standards. He must deal with a group of pupils whose experience in vocation is far from rich. Thus he cannot rely upon his pupils promptly to hit upon the principle for themselves by unaided study of a type case; nor can he rely upon their acquisition of understanding of it by mere showing-telling. Accordingly he must seek an intermediate method.

His first step must be to establish in the minds of his pupils the motive to 'get the principle' — a readiness to undertake

analysis. Ordinarily that is a matter of problem assignment. His next step is to guide the pupil — the pupil being relatively unaware that he is led — to attend to those features in the case which are significant. That is, to stimulate particular mind-sets appropriate to establishing “prepotency” for those particular elements in the situation. Again assignment plays an important part, but so also do personal supervision and questioning. The third step is to stimulate perception of relations — largely a matter of suggestive questioning, or wordless action by the teacher. Roughly, then, the teacher must stimulate the pupil (1) to a desire for perceiving the principle, (2) to attention to the significant factual data in the case, and (3) to explicit awareness of the relation of the factual data in the case.

Teachers are much given to simplifying cases for purposes of study. They abstract from the reality of a situation the essential features, place them in relation according to the principle which they wish the pupil to perceive, and ‘present’ the whole as a ‘case’ for analytical study. The forms of such abstraction most suggestive of the reality are found, perhaps, in models of objects. But diagrams, sketches, and tabulations are designed to the same end: namely to shear off and do away with distractions from irrelevant features that are certain to be present in the composite of realities which make up a genuine case. Models, diagrams, sketches may suggest quite accurately that which in the real case cannot be observed with accuracy; or they may through special prominence of one or another feature among those ‘presented’ give it special emphasis. For example, in teaching the principle of the cycles in the gas engine there is frequently used a model of a cylinder, piston, valves, crankshaft, and flywheel in which turning of the flywheel will move the parts in the same fashion as those to which they correspond move in the engine. It is not a real case of intake, compression, ignition, expansion, exhaust, but it serves to illustrate the principle in a very effective way. It does so, not only because it makes observation easy in the

physical sense as it is not in the engine, but also because it represents an abstraction from the engine of just those parts and movements to which attention must be directed for perception of the principle. Enlarged models in papier-maché of the human eye, ear, or other organs, serve a useful purpose in teaching anatomy. They suggest not the facts only but the functional relations of parts. As with the piston model they are selective of particular features; by enlargement and isolation they are emphatic. The use of color in diagramming and sketching as red lines, blue lines, — is another mode of directing attention to particular features and relations. A tabulation of the weights of grain from a dozen plots of wheat subjected to successive equal increments of 'nitrate nitrogen' may serve excellently to 'bring out' the principle of diminishing returns. But, as with the piston model, and the eye and ear models, it is not a complete case. In the complete case, for instance, are present many other features, such as amount of phosphoric acid, calcium, and potash in the soil of the plots, the structure and texture of the soil, the amount of water absorbed by the soil of each plot, the color of the standing wheat, the weight of straw, the size of wheat grains, etc. A tabulation of weights offers only a select abstract of the significant features.

Such are highly useful modes of guiding the exploratory activities of students — often they are virtually indispensable. Their virtue is in their incompleteness as cases; and so is their weakness. For if the pupil has not a background that enables him to fill in the accessory details, or if he does not concomitantly with the study of the 'illustration,' or shortly before such study, or shortly after such study, deal with a complete case, it is unlikely that he will possess a functional knowledge of the principle. He may well be unable to recognize its presence in a real case set before him. The man who is introduced to a lady in a modern bathing suit can hardly be held responsible for recognizing her later in fur coat and helmet hat. The man who can trace out the ignition system on a diagram is not, therefore, qualified to trace out the system on the very car from which

the diagram is made. We can easily strip too much. To put the matter paradoxically model, diagram, sketch, or tabulation may well be educative in the degree that it shows more than it shows.

The same theory explains both the effectiveness and the limitations of verbal descriptions of cases, and of 'hypothetical cases.' Description is inevitably selective and the hypothetical case manifestly so. Both are of great value in the teaching of principles, but their successful use implies either that the learner has behind him an experience from which he can draw profitably for an impression of the reality, or that in some very immediate fashion he has to deal with a complete and real case. Models, diagrams, sketches, tabulations, descriptions, and 'hypothetical cases' are really guides to the study of cases, rather than cases for study of themselves.

The completeness or reality of a case is, of course, only relative. A list of figures on the blackboard, for example, is a reality as truly as is a 'batch of concrete mix,' a bag of wheat, or a pile of straw; it is, moreover, as complete in its segregation from other affairs in the world as is the concrete mixing or the wheat plot experiment. We must measure the reality in a represented case by reference to such cases as the learner is to deal with in his vocation. Thus if the kind of job for which the worker is to be prepared is to prescribe the proper amounts of cement, sand, and coarse aggregate in concrete mixing, a blackboard tabular 'presentation' is a close approximation to the real case; if the job is to supervise or take part directly in the mixing of concrete, then, obviously, the blackboard case is neither real nor complete. For instance it offers no experience of the 'sharpness' of sand, the cleanliness of gravel, and so on, which are features entering into understanding of the principle, in any functional sense. Again, if the job ahead is to study tabular data from experiment stations and interpret them in terms of the law of diminishing returns, undoubtedly the tabular presentation is a relatively real and complete case. But if the job is to determine whether or not further applica-

tion of fertilizer or irrigation water is promising of profit on a given farm, obviously the tabular case is neither real nor complete. A very considerable range of factual relations that do appear in the farm problem are entirely absent in the represented case. Always the teacher should consider how far the teaching situation is like the vocational situation for which it is designed to prepare the pupil. This has been said before, but it cannot too often be reiterated.

4. So far we have dealt with discovery of principles through analysis of single or few type cases. Several times the idea has been put forward that the pupil by such means comes to 'perceive' the principle in the case. But earlier we spoke of principles as 'governing concepts.' Now perhaps there is no distinguishable difference between perceiving a relation and conceiving a principle. Indeed the psychologists are so far uncertain in the matter that they tend to discard both words. Nevertheless, the words are suggestive. In analysis of a single case the analyzer sees *through* the mass of extraneous detail and *grasps* the essential elements and pattern (*per* and *capere* in the Latin). In dealing with many cases he brings *together* elements which he has *taken* from each one of many and builds them into a concept (*cum* or *con* and *capere* in the Latin). In terminology and description of process this statement smacks a little of the old fashioned, but it does suggest that principles are acquired through multiplicity of cases or repeated experiences.

Comparison and Contrast

There are probably a good many elements of meaning for the reader in the word *incomplete*; possibly not many in the word *furuncular*. Except that they are both words and both of Latin origin he may not note any likeness between them. If, however, they appear in a list as follows, he will note at once another likeness:

incomplete	recognized
furuncular	Kantianism
pasquinade	helminthic
hendecagon	officially
absolutely	foreigners

When the reader sees the word Dresden he is likely to think of porcelain ware and a city somewhere in Germany; when he sees the word Toulouse he is likely to think of a breed of geese and a city somewhere in France. He will hardly think of Dresden and Toulouse as alike except in being names for European cities. If, however, they appear in a list of words like the following he is quite sure to think of both in another way:

Dresden	Austerlitz
Toulouse	Wagram
Aboukir	Borodino
Jena	Leipsic
Marengo	Waterloo

In both cases the reader has finally placed the first two words in a class, or come to a generalization about them. Incomplete and furuncular now belong to the class of ten-letter words and clearly possess a likeness; Dresden and Toulouse now belong to the class of words signifying battle-fields of the Napoleonic wars, or possess a likeness other than that at first noted. In each illustration by multiplication of cases the same suggestion has been repeated ten times, so that the elements have become 'prepotent' and 'stand out' in consciousness as they did not with the single word or even with the 'presentation' of the second word. 'Ten letters' and 'word' have been suggested ten times each in the first illustration; 'word,' 'battle-field,' 'Napoleonic wars,' ten times each in the second illustration. But other elements of meaning have been suggested less frequently, and in more or less contradictory fashion. The mind-set to ten-letter-ness in the first list finds satisfaction throughout, as does the mind-set toward battle-fields in the second. But a set toward three-syllable-ness in the first or

toward European city in the second does not. All the words in the first list 'fit' under the generalizations, long-words, words-of-the-same-length, ten-letter-words, but they do not 'fit' under the generalizations, three-syllable-words, four-vowel words, words-derived-from-the Latin, adverbs, etc. All the words in the second list 'fit' under the generalizations, names-of-places, names-of-cities-in-foreign-lands, names-of-battle-fields, names-of-battle-fields-of-Napoleonic wars, but they do not 'fit' under the generalizations, long-words, three-syllable-words, names-of-places-in-Europe, etc. All are alike in certain particulars, many are alike in further particulars, but none are alike in all particulars. Hence, by virtue of repetition and uninterrupted satisfaction in the roused set of mind, the generic elements come to the fore, and we make a generalization, or discover a principle whereby the meaning of the first word dealt with is changed for us.

The reader may never have hunted in Africa, but he has dealt somehow with a rhinoceros and 'knows a good deal about a rhinoceros.' He will note, perhaps, that the following list of paired words suggests to him features and relations of a rhinoceros which have not at the moment sprung up in his mind despite the fact that the word rhinoceros has already passed under his eye four times in this paragraph.

1. Rhinoceros-agate
2. Rhinoceros-plum tree
3. Rhinoceros-oyster
4. Rhinoceros-codfish
5. Rhinoceros-ostrich
6. Rhinoceros-mouse
7. Rhinoceros-draft horse.

The rhinoceros and the agate are alike in being material things, but they are distinctly different in that the rhinoceros lives and the agate does not; the rhinoceros and the plum tree are alike in being alive, but they are markedly different in that one is an animal and the other a plant; the rhinoceros and the

oyster are alike in being animals, but they are notably different in that one possesses a backbone and the other does not; the rhinoceros and the codfish are alike in the possession of backbones, but they are quite different in that one is warm blooded and the other is not; rhinoceros and ostrich are alike in being warm blooded, but very different in that one has four legs and the other has not; rhinoceros and mouse are alike in having four legs, but conspicuously different in size; rhinoceros and horse are alike in being large mammals, but quite different in that one is wild and has a horn on his nose, and the other is domesticated and has a smooth profile.

In every pair, of course, the two are alike in other respects than those mentioned and different in respects not mentioned — alike in being different, for instance, or different in their likeness. But the differences emphasized probably tend to suggest characteristics in a rhinoceros: i.e. —

1. That the rhinoceros possesses life.
2. That the rhinoceros is an animal.
3. That the rhinoceros is a vertebrate.
4. That the rhinoceros is warm blooded.
5. That the rhinoceros is a quadruped.
6. That the rhinoceros is a large mammal.
7. That the rhinoceros is wild and has a horn on his face.

If these things are suggested by the list quite evidently they help to initiate development of understanding of the principle of rhinoceros — the elements of feature and relation which are common to all rhinoceroses.

The illustrations are crude. They do not approximate either reality or completeness in any vocation save, perhaps, that of teacher of teachers. They do illustrate once more, however, the influence or past experience and present mind-set upon discovery of common elements. No one who could neither count nor read would arrive at the discovery that *incomplete* and *furuncular* are alike in possession of ten letters; no one not informed in European History would arrive at the discovery

that Dresden and Toulouse are alike battle-fields of the Napoleonic wars; no one unacquainted with the skeletal structure of fish and mammal would arrive at discovery of the possession of a backbone by our rhinoceros. Again, most readers — who have read all this — will have noted that before going far with the lists their set of mind changed, so that they were comparing or contrasting the words with a more or less definite purpose in mind to discover what in the way of generalization they suggested. Part of this change was due, no doubt, to the accompanying text, but part of it was due to the columnar arrangement of the lists. Every reader will agree, I think, that at the end he was analyzing word by word with respect to the presence or absence of certain elements, and that he would have saved time in arriving at his conclusions if his mind had been set at the beginning to discover the points of agreement and difference in the 'cases' listed.

Once more let the reader attack some listed words. This time let him set his mind definitely to discover (1) what are the chief elements of likeness (a) in the words of column I, and (b) in the words of column II; (2) to discover what are the chief differences between the words of the two columns by pairs horizontally:

I	II
acuminate	deye
emarginate	bede
obcordate	deme
mucronate	here
cuspidate	leda
serrulate	lese
dentate	leue
crenate	nede
undulate	rede
sinuate	seen

He will discover readily enough with respect to column I that the words are all adjectives ending in -ate; with respect to column II that the words are all of four letters and contain

two e's. If he has a sufficient experience with Latin and botany he will generalize with respect to any word in column I that it is a botanical term derived from the Latin and descriptive of the shape of a leaf. If he has a sufficient acquaintance with Chaucer he will generalize with respect to any word in column II that it is an Anglo-Saxon verb. But when he comes to the relations of the pairs he meets a real difficulty. He can say, of course, that a Latin-derived adjective ending in -ate and descriptive of leaf form to a botanist is followed by an Anglo-Saxon verb with two e's in it. But perhaps the most meaningful thing he can say is that the relation is long word-short word. Certainly the words in the two columns are very different from one another in what they suggest. Their differences are probably greater than their likenesses, if we can use a quantitative expression in such a connection. But the only feature in which they 'contrast' effectively is in length. It means something to contrast a long word with a short word, but it means next to nothing to contrast an adjective with a verb, or a Latin derivative with an Anglo-Saxon standard. Probably, however, the reader will admit that in arriving at such conclusions he was able to move more methodically and swiftly, considering difficulty, than he did in previous illustrations where the set to compare and contrast was not definitely established at the beginning of his attack. He will probably be ready to grant, too, that he would have moved more swiftly still if the assignment had been to compare with respect to classification in grammar, with respect to similarity of letters, with respect to lingual source, etc., and contrast with respect to length of words.

To repeat — a principle, law, standard, or ideal involves understanding of elements of fact and relation in a number of situations which may be in other respects variously different. Understanding of principle is commonly arrived at by dealing with a variety of situations or cases which in certain respects of the mental activities which they stimulate are alike.

The systematic ordering of variant experiences to the end of

learning to respond to not-identical situations in terms of likeness is called the method of comparison and contrast, or 'agreement and difference.' Comparison and contrast are very much the same thing. In comparison cases are brought together because of their likeness in certain particulars; in contrast they are brought together because of their difference in certain particulars. So in teaching the standard of beef type in cattle we are accustomed to call upon students to compare Shorthorn, Hereford, Angus, and Galloway, because they all have the beef conformation, and to contrast them with the Holstein, Jersey, Guernsey, and Ayrshire because they are of a very different conformation. But it is not to be forgotten that the dairy breeds are cattle and have many of the characteristics of all cattle, which they share with the beef breeds. They are not entirely different from beef cattle, or as much different from beef cattle as are soup spoons. But we do not contrast beef conformation with spoon conformation. Again in teaching the principle of classification of foods for growth we are accustomed to call upon students to compare milk, eggs, beef, and to contrast them with sugar, potatoes, and corn starch. But potatoes, cornstarch and sugar, are foods, and much more like milk, beef, and eggs than like sonnets or sonatas. In contrast, then, as in comparison, there must be similarity of cases, but difference in the particulars compared. Much contrasts well with little, but everything does not contrast effectively with nothing. $Abcd$ as compared with $Abcf$ brings out Abc ; $Abcd$ as contrasted with $xyzd$ may also bring out Abc ; but $Abcd$ as contrasted with $\#\$ \% \frac{3}{4}$ does not bring out Abc — it simply brings out 'letters' because $Abcd$ and $\#\$ \% \frac{3}{4}$ are alike in being symbols, but different as kinds of symbols. For that reason the method of comparison and contrast, or the 'method of varying concomitants,' is treated as one method and not as two.

Everyone knows that we arrive at generalizations through multiple experiences of similarities and differences without any conscious analysis. But it will have been noted in the illus-

trations with words that a conscious analysis is a great reinforcement to mere repeated observation. In teaching practice analysis also is not a distinct method, but an integral part of effective comparison and contrast — we cannot compare particulars till we are aware of them.

It is customary to teach the proper relating of cement, sand, and coarse aggregate in concrete mixtures by lecture, bulletin, or hand book stating the requirements of a good mixture and giving rules for proportions. This is often followed by some laboratory requirement of making a mixture, usually by a group of pupils together. Now for the prospective farmer and the small contractor such is probably a sufficient teaching to enable him to face his problems in the mixing of concrete. Because he deals with small quantities in situations which allow of considerable latitude in matters of cost and strength and durability of the product an ability to follow specific directions is all that he needs. The construction engineer, however, who depends on the rules in his hand book is not one who adjusts himself to small differences in costs and product requirements which in large undertakings of construction become in the aggregate very significant, marking the difference between profit and loss for the contractor, safety and danger for the owner and users, and long life or short life in the concrete structure. He has need of the principles of concrete mixing so that he may adjust his doings finely to particular varying conditions.

Supposing, then, that it is desired to develop understanding of the principle or principles in mixing. Assuming that the student is aware of the responsibilities of the engineer in the matter and desirous of living up to them, i.e. has a motive to understanding of the principles, and that his immediate attention is focused by assignment upon points of agreement and difference in essential features, the following may serve as an example of systematic teaching through 'varying concomitants.'

The student shall direct and observe, or take active part in, the mixing process, and test the crushing strength, according to a standard agreed upon, of the product, in such cases as these:

Points of agreement.

Kind and amount of
cement.

Kind of sand.

Kind and amount of
coarse aggregate.

Intimacy of mixing.

Strength of product,
i.e. *a* and *b* meet the
test.

Case *a* — 1 : 2 : 4 mixture.

Case *b* — 1 : 1 : 4 mixture.

Points of difference.

Amount of sand.

Cost of mixture.

Kind and amount of
cement.

Kind and amount of
sand.

Kind of coarse aggregate.

Intimacy of mixing.

Strength of product,
i.e. *a* and *c* both meet
the test.

Case *a* — 1 : 2 : 4 mixture.

Case *c* — 1 : 2 : 8 mixture.

Amount of coarse
aggregate.

Cost of mixture.

Kind and amount of
cement.

Kind of sand.

Kind and amount of
coarse aggregate.

Intimacy of mixing.

Strength of product,
i.e. *c* and *d* both meet
the test.

Case *c* — 1 : 2 : 8 mixture.

Case *d* — 1 : 4 : 8 mixture.

Amount of sand.

Cost of mixture.

Kind and amount of
cement.

Kind and amount of
sand.

Kind of coarse aggregate.

Intimacy of mixing.

Case *d* — 1 : 4 : 8 mixture.

Case *e* — 1 : 4 : 10 mixture.

Amount of coarse
aggregate.

Cost of mixture.

Strength of product,
i.e. *e* does not meet
the test.

Points of agreement

Kind and amount of cement.
 Kind of sand.
 Kind of coarse aggregate.
 Intimacy of mixing.
 Strength of product, i.e. *d* and *f* both meet the test.

Kind and amount of cement.
 Kind and amount of sand.
 Amount of coarse aggregate.
 Intimacy of mixture.
 Cost of mixture.

Kind and amount of cement.
 Kind and amount of sand.
 Kind and amount of coarse aggregate.

Amount of cement.
 Kind and amount of sand.
 Kind and amount of coarse aggregate.
 Intimacy of mixture.

Case *d* — 1 : 4 : 8 mixture.
 Case *f* — 1 : 3 : 9 mixture.

Case *d* — 1 : 4 : 8 mixture.
 Case *d'* — 1 : 4 : 8 mixture.

Case *d* — 1 : 4 : 8 mixture.
 Case *d''* — 1 : 4 : 8 mixture.

Case *d* — 1 : 4 : 8 mixture.
 Case *D* — 1 : 4 : 8 mixture.

Points of difference

Amount of sand.
 Amount of coarse aggregate.
 Cost of mixture.

Kind of coarse aggregate.
 Strength of product, i.e. *d'* breaks under test.

Degree of intimacy of mixing.
 Cost of mixture.
 Strength of product, i.e. *d''* breaks under test.

Kind of cement.
 Cost of mixture.
 Strength of product, i.e. *D* breaks under test.

And so on, varying concomitants in terms of changing proportions of ingredients, intimacy of mixture, quality of ingredients, cost of mixture, test to be met, according to the refinement of understanding and degree of fixation of the prin-

ciple it is desired to develop. Even such a series as suggested, if the motive and set of mind appropriate be established at the start, would probably be quite effective in leading to understanding. Such a systematic and controlled organization is not uncommon in college study of science in the laboratory and in vocational studies — e.g. teaching the principles of ice-cream mixing according to the plan of Professor Ross.

The illustration above assumes a controlled and objective scheme of environment, or the laboratory type of teaching. Often such an arrangement is neither possible nor necessary. It is too expensive of time and materials to be undertaken. But cases which are compared in points of agreement and difference need not be present and objective cases. They may lie in the past experience of the pupil. Even where the use of objective cases is desirable, as above, if the teacher knows and makes use of comparable experiences in the life of his pupils he may effect considerable savings in time and materials. Almost always he can and must rely in part upon cases with which the pupil has already dealt in some fashion or other, and sometimes wholly upon such.

Suppose, for example, that the teacher has to teach a group of farm boys in the high school the relation of feeds rich in digestible protein to the growth of young animals. Those boys are very certain to have a considerable range of experience of which he can make use. Very likely a good teacher can do most of the teaching necessary to understanding of the principle right in the classroom, with a relatively small proportion of objective study in the field or laboratory. The boys are likely to know that a good many particular babies are started on milk, that calves are started on milk, that pigs, and lambs, and colts, and kittens, and puppies, are started on milk; that growing calves are fed on clover or alfalfa hay or rowen, with a little oil meal, or middlings or bran; that middlings and bran and skim-milk or butter milk are used in the slop for pigs; that growing chicks like angle worms, meat scraps, clabbered milk, green clover; and so on, and so on. The teacher has a

rich fund of cases to draw on. Moreover such a fund of experience makes usably effective reported cases of feeding babies, calves, pigs, lambs, chickens, etc. as they come from texts and bulletins. So far as insight into the principle is concerned class discussion in terms of analysis, comparison, and contrast of cases once dealt with or now reported may well be sufficient. The value of directed 'application' of principles discovered to real and complete cases is to be treated a little later on.

Most people have a fund of experience sufficient to the understanding of many principles. The reason that they are unaware of many is that similar and contrasting cases in their experience have occurred haphazard, and that their motives and specific mind-sets in dealing with such have been unfavorable to analytical comparison and recognition of similarities and differences. That is why men long on the job display, sometimes, an apparent ignorance of principles that is astonishing to the teacher; but yet may be easily taught principles.

Centuries of use have proved the value of comparison and contrast as method in developing concepts. It is easy to see how comparison by repetition of response to the same elements should be effective. But just why contrast is effective is not, from the psychological viewpoint, quite clear. If we compare two economically heated houses in detail of heating plan, costs, and effectiveness, it is readily to be seen that the several coördinate features of economical heating must be dealt with twice at least, and if the process of comparison in terms of likeness is continued, that the repetitions of the same mental reactions will increase the likelihood of the same responses again in new situations where the same elements are present. This is entirely in accord with the common understanding of habit formation. If, however, we contrast an economically established and maintained heating system that heats well with one that is costly at the start, expensive in maintenance, and ineffective in heating we have dealt with the features of wasteful system exactly as often as with those of economical system. According to Professor Thorndike and many others among psychologists

man is born with an instinct to respond attentively to sharp contrasts. If that is so, then, increased attention may add vividness to experience if we use contrast. But that increased attention may as well be drawn to the undesirable as to the desirable features. Hence, by such a contrast as we have mentioned, it would seem that we are quite as likely to establish a wrong principle as a right one. In itself, then, contrast may effect a relative nullification of the thing we wish to teach. But if we can attach to the attentively observed contrasting features and relations, in the first case a feeling of satisfaction and desirability, in the second case a feeling of annoyance and undesirability, then we have strengthened the right principle and weakened the wrong principle. In the illustration of the economical and the wasteful systems of heating this matter largely takes care of itself, for the reason that all persons capable of making the contrast in systems have already learned to associate desirability with economy and comfort and undesirability with waste and chilliness. Teachers of spelling, some of them at least, have long ago learned that contrast of right spelling and wrong spelling is dangerous, because the pupil has no strongly established preference for spelling correctly, especially if he has spelled the given word incorrectly before. And there are occasions in vocational teaching where the same danger exists. It is well that the teacher of principle avoid the use of contrast until he has established a favorable attitude toward the features and relations which he wishes to be understood.

All this suggests the desirability of positive teaching rather than negative. By virtue of habit we tend to favor the old as against the new. Therefore start teaching of a principle with a positive case rather than a negative one. Consider, for example, economically heated houses before coming to cases of the wastefully heated. To teach the standard of conformation in beef cattle begin with beef cattle rather than with dairy cattle. To teach a standard of good finish in painting begin with a study of good jobs, and not with study of bad jobs.

To teach the ideal of beauty in dress begin by dealing with cases of beautiful dress and not with cases of ugly dress. And so on. Unless the pupil is already in some measure familiar with and favorable to the right thing we do not start with the wrong thing. In general contrast should be both accessory and subsequent to analysis and comparison of type cases in the development of understanding of principles, laws, standards, and ideals

A schematic illustration may suggest now more clearly the process by which principles are brought to the fore in comparison and contrast. Suppose a class of girls (1) who desire to possess ability in selecting textiles wisely; (2) who respect their teacher's judgment in selection of cloth; (3) who through use of the hand loom briefly have learned to recognize warp and filler threads and their relation. They have a proper motive and a favorable specific mind-set to the study of textile samples set forth and classified by the teacher. Suppose the teacher provides twelve samples, six of which exemplify in her judgment excellence of weave, and six of which exemplify very poor weave. Her procedure is to have the girls compare the first series of six, the first with the second, the third with the fourth, the fifth with the sixth, and then to contrast each specimen of the first six with the specimen in the same place in the second series. What happens?

Let us make some further suppositions. Cotton cloth has many features, but let us take only three, texture or weave, weight, and color. Represent warp and filler (weave) by wf, excellent standard by E, and poor standard by P. Suppose there are three weights of cloth, heavy, h, medium, m, and light, l. Let there be six colors which we will not name, but designate as q, r, s, t, u, v.

The first or excellent weave series is then:

wfEhq wfEmr wfEls wfEht wfEmu wfElv

The second or poor weave series is:

wfPhq wfPmr wfPls wfPht wfPmu wfPlv

<i>Comparisons</i>		<i>Contrasts</i>	
wfEhq	with wfEmr	wfEhq	<u>wfEmr</u>
wfEls	with wfEht	wfPhq	<u>wfPmr</u>
		wfEls	<u>wfEht</u>
		wfPls	<u>wfPht</u>
wfEmu	with wfElv	wfEmu	<u>wfElv</u>
		wfPmu	<u>fPlv</u>

By repetition with satisfaction wfE, the desired standard, has been emphasized six times through comparison and six times vividly through contrast.

wfPr has been attended to six times in contrast, each time with disapproval or dissatisfaction.

According to the laws of learning the tendency to respond to the correct standard has been definitely strengthened; and tendency to respond to the wrong standard has been definitely weakened.

The other factors scarcely stand out at all. I.e.

h in satisfying association			4 in annoying association			2
m	"	"	4	"	"	2
l	"	"	4	"	"	2
q	"	"	2	"	"	1
r	"	"	2	"	"	1
s	"	"	2	"	"	1
t	"	"	2	"	"	1
u	"	"	2	"	"	1
v	"	"	2	"	"	1

Even including more numerous and complicating factors it is possible to figure out a procedure in which extraneous features will 'cancel' almost completely. But such arrangements are unnecessarily elaborate for practical use. What is shown schematically here is not so far remote from practical comparison and contrast as to seem absurd, and it may help to make clear how we strengthen the desirable, weaken the undesirable, and keep the extraneous relatively in the background by such method.

Many teachers are in the habit of providing that every

important generalization shall be framed in words. That the practice of verbal formulation increases the probability that the principle will function has not yet been proved by scientific investigation. Professors Bagley and Judd are confident that evidence points in the direction of positive value for the practice. It has a vast support in the belief of teachers, and still more, perhaps, in the faith of those who neither teach nor study teaching. The widespread use of notices, slogans, codes, creeds, and precepts is evidence of popular faith in the efficacy of the practice.

The ability of a pupil to state in words a principle is often thought to be evidence of his understanding of it. If the pupil has formulated a statement out of his own experience as analyzer, or comparer and contraster it is good evidence that he sees the features and relations which constitute the principle. By no means, however, is it final evidence that the principle is likely to govern the conduct of the pupil. So, for example, if a student of cases of increments and returns in the treatment of agricultural land makes, as a result of his examinings and comparings, an accurate statement of the law of diminishing returns we may be confident that he is intellectually aware of it; but we have no assurance that he will be guided by it in his own practice of agriculture. If a student after 'judging' beef cattle can describe accurately in his own words the standards of excellence in conformation we may be sure that he is aware of the features and relations in standard of beef type; but we do not know that as breeder of beef animals he will be guided by the ideal suggested. If a student from observation of the operation of gasoline motors and models of them can state the sequence and relations of strokes of the piston, operation of the valves, place of spark, movement of mixture and burned gases, etc., we say that he knows the principle of the cycle, but we cannot say that he is going to be a successful adjuster of valves and timing.

Some teachers as regular practice, many teachers occasionally, call upon pupils to formulate in words, or in words and diagrams

or sketches, the principle that through analysis, or comparison and contrast, the pupils have discovered. This is probably good practice. The requirement serves to focus the attention of the pupil upon desired features and relations; criticisms of the statement by others in the class may serve to check incorrect conclusions both by criticized and critics. The teacher's own final criticism may add to clarification. To ensure this focusing for all pupils a requirement of written formulation is used by some good teachers.

As a rule, however, the statement of principle is made by the teacher for the class rather than by the pupil for criticism by class and teacher. This practice is designed to save time. But it has weaknesses. In a record of some hundreds of observations of this practice in vocational schools of secondary and higher grade it appears that the practice has three main varieties:

1. The teacher states the principle to be studied in advance of the study of it.

2. At an intermediate stage — say after analysis of the first type case — the teacher states the principle, and then 'gives' or calls for verification in further 'illustrative cases.'

3. At the close of study of features and relations common in a succession of examples or cases the teacher states the principle as a summary of findings.

Three college teachers observed appeared to make it their regular practice to do all these things. Other teachers used 2 and 3, 1 and 2, 1 and 3. But by far the most common practice is that of stating the principle at the beginning, perhaps several times, dictating it, or requiring that it be memorized from a book, — just as in study of arithmetic or algebra we used to be required to learn the rules first, and afterwards to find out what they were about. E.g. — in beginning the study of the binomial theorem, presumably to learn it, we 'learned' it first and studied it afterward. Until we were successful in repeating, "The square of the sum of two quantities is equal

to the square of the first plus the square of the second plus twice the product of the first and the second," we were not ready to deal with cases of squaring $a + b$, $m + n$, $x + y$, $2a + 3c$, etc.

Now something is to be said for the practice of beginning study of a principle by a formal statement of it. To do so may not be futile. It may be very useful in giving the specific set of mind favorable to analysis of type cases — i.e. in calling attention to the features and relations to be observed and otherwise dealt with, for instance, the particulars to be compared or contrasted in cases. But its usefulness is probably directly proportional to the familiarity of the pupil with the features and relations to be 'discovered.' "The kind of stimulus which will call forth the nerve-impulse depends on the peripheral termination of the afferent nerve" — that is a statement of principle probably wholly useless for introduction to study of the physiology of reactions with a beginners' class — even of college students; it might be helpful to advanced students about to undertake critical examination of cases of reaction to light, sound, electricity, etc. A detailed description of the 'standard of perfection' in the Barred Plymouth Rock is probably a suggestive introduction to the study of show types in Plymouth Rocks for a group of 'Rock' breeders in a judging school, but it is a waste of time for the city boy who wants to learn poultry types, and not much better for the average college student from the farm. To the beginner with gas engines the following statement means a little more than nothing: "An engine has power balance when the power impulses occur at regular intervals in relation to the revolution of the crank shaft." The experienced garage mechanic might find it a useful guide in the comparison of various automobile engines. "Vitamin D and the ultra-violet rays from direct sunlight have the same antirachitic effects upon mineral metabolism." That may make a worth while summary generalization of conclusions from the study of cases of feeding cod-liver oil and of exposure to sunlight in rearing rats and

babies, but is useless as an introduction to such study of cases for the average class in nutrition. Whenever the teacher plans to use what has been miscalled the Cartesian Method of introducing study in such fashion, he should consider carefully how far the formal statement is really suggestive to the learner whom it is intended to help.

To frame the statement of principle after analysis or comparison and contrast of a few cases, or at the intermediate stage, is, of course, to ensure against the chief weakness of the abstract introductory statement. The pupils are in process of becoming aware of the principle, at the least, and have an experience to give color of meaning to the abstraction. Thus formulation at such a stage is likely, by directing attention once more to significant features, to 'bring out' the principle. At any rate it serves as a meaningful guide and check (specific mind-set) for further analysis, comparison and contrast.

The summary formulation by the teacher sets a sort of stamp of final approval upon the discovered principle, provided the teacher has his pupils 'with him' in the summary. If they look upon his statement as a mere "verbal rehash"¹ of what they already know well enough, it is, of course, ineffective. But if the activity of pupils has been thoroughly engaged throughout the learning period reiteration may be satisfying, climactic — and not boring. In that event the final summary statement makes for fixation of the principle.

The chief weakness in verbal formulation by the teacher is that it is formulation by the teacher — and may be that only. One learns to generalize by generalizing, not through generalization by someone else. Hence to be most effective the teacher's generalization should be barely anticipatory to generalization by his pupils. In the degree that they are passive rather than participant they will fail to profit by statements from authority. At the best the teacher speaks as a mouthpiece for his class. When he does that he saves time by statement of principle; if not he probably wastes it.

¹ Comment on my own attempt at such summary by a student.

Most teachers 'illustrate' the principles they state. Sometimes they cite and analyze for the class several 'cases' and arrive at a statement 'inductively'; again they follow the statement by making 'application of the principle in illustrative cases'; or they may both precede and follow the statement by illustrations. In fact these modes are fairly characteristic of lecture 'developments' and lecture 'presentations' of principle. They are probably effective in just the degree that illustration and statement engage the pupils. To engage the pupils, illustrations, as has been noted, must suggest a reality in experience, and the statement must suggest the implications of such experience. A few teachers are excellent 'illustrators' and very successful in teaching principles by lecture. They are the men and women who 'think aloud' in terms of the lives of their pupils. Most teachers, however, are on far safer ground, when in generalizing they call upon the pupils to furnish illustrations. Pupils cannot remain altogether unengaged under those circumstances.

It is a very common belief of teachers that they teach principles by telling and showing, and 'fix' them afterwards by requiring pupils to 'apply' them in practice. E.g. — the lecture-laboratory sequence. Whether that is so or not depends upon what 'knowing' a principle means. If it means just to be able to give honest intellectual approval to a system of relation when it is pointed out, then any fairly clear exposition of principle in text or lecture may be said to teach a principle. But if it means 'functional knowledge' of the principle — that is, ability to recognize and use it in meeting new situations — then exposition is a very uncertain method of teaching principles. Many teachers have noticed that many pupils have a struggle when it comes to 'applying the principle they have been taught.' Some have blamed the pupils for their ineptitude. Others have recognized what is probably the true state of affairs — that exposition has failed to develop a functional knowledge, or that the pupils have not *learned* the principle. They have noticed too that many apparently stupid

pupils do become able to 'apply' successfully if 'practice' be continued through a considerable series of 'applications.'

Application has roughly three functions:

1. It teaches the pupil to understand what the teacher and the text have been talking about. I.e. — it develops concepts by analysis, comparison, and contrast.

2. By multiplication of cases it 'fixes' through repetition, and extends the range of associations in which the principle is met, thus strengthening the probability that it will serve as a guide to activity in new circumstances. For this reason, with important principles, application should often follow true discovery by the pupil himself.

3. It serves as a check for the discerning teacher upon the effectiveness of his teaching.

What we call teaching by application is really the same thing as teaching by 'varying concomitants.' This mode of teaching, the reader will note, falls back, as does analysis, upon the same bases as did the modes of teaching facts: namely, *Stimulation of active and satisfying discovery*, and *stimulation of active and satisfying use* of that which is discovered.

SUMMARY ABSTRACT

1. Meaning of one fact that enlarges the meaning of other facts is a general meaning to the extent that it does so. Inclusive meanings of the sort enable the producer to deal with new objects and events in vocation in terms of 'governing concepts' — principles, laws, standards, and ideals. Hence, as a means to growth and adaptiveness to changing situations, generalizations are among the most important objectives in teaching vocations.

2. The method of arriving at generalizations — or 'governing concepts' — is a composite of:

- a. Attentive examination — or *analysis* — of a particular representative case
- b. Similarity in experience of variant cases — or *comparison*.
- c. Unlike experience of dissimilar cases — or *contrast*.

Emphasis upon one or another feature of the method may vary, so that generalization 'comes to the foreground in consciousness' — or the

principle is learned — chiefly by the 'method of analysis,' or chiefly by the 'method of agreement' (comparison), or chiefly by the 'method of difference' (contrast). Always, however, the learning of principles, laws, standards, and ideals involves the use of situations having 'identical elements' with 'varying concomitants' or cases of a kind but different.

3. Analysis implies the study of a type case — or a case involving the principle. It consists in 'picking out and putting together' the elements which constitute the principle. But which elements the analyzer will 'pick out' and how he will put them together depends upon his set of mind as determined, largely, by his previous experience. Since many features of the case may have no bearing on the principle a mere "piece-meal examination" may fail to reveal it. Insignificant features may stand out rather than the significant. When a learner discovers a principle without guidance his satisfaction in the discovery may strengthen his knowledge of the principle. But unguided analysis is slow and uncertain. A teacher may stimulate a set of mind which will lead to discovery without the learner's becoming aware that he has been 'steered'; if the teacher can do that he effects economy in analysis without loss in 'pride in achievement' on the part of his pupil.

Unguided exploration and 'pointing out' are both most effective when the pupil has a considerable experience of cases involving the principle which he has not yet discovered. This is because the proper elements have become "prepotent" by repeated experience and affect the mind-set of the analyzer. To enable a genuine 'self-active' analysis the teacher must either know that the pupil has had appropriate experience or must stimulate directly a set of mind that will cause the features to be noted to stand out satisfyingly. Thus both unguided exploration and guided analysis are superior to the method of 'pointing out,' because both involve a large measure of self initiated activity on the part of the pupil. Which method should be relied on must be determined by the importance of the principle to be taught. The more important the principle the more active should be the process of learning. A principle which need not be 'fixed' may be 'pointed out.' Since most pupils have limited experience of vocation and most teachers are limited in the matter of time neither the 'method of Agassiz' nor the method of 'pointing out' is generally to be relied on for analysis. A method of problem assignment and suggestive supervision is indicated as in general safe and economical.

To facilitate analysis many teachers rely on the use of simplified cases. Such are useful but they have their dangers. The chief danger lies in the very fact of simplification — because they are simplified they are abstract.

4. Effective teaching by comparison and contrast involves a systematic organization of varied type cases and off-type cases with reference to repeated emphasis upon features and relations to which the learner is,

by virtue of established mind-set, attentive. A particularized attention, or analytical mind-set, then, followed by repeated experience of the same items, brings them to the fore by the simple laws of learning. Variety also increases the range of associations and the probability of 'fixation in usable connections' — or the probability that the principle learned is useably learned. Stripped and hypothetical cases can be compared and contrasted effectively only on the same basis as makes them helpful in analysis. The so-called 'application' of principles is in the main really comparison and contrast of cases leading to discovery of the principle, but may be in part, at times, a genuine repetitive practice in the use of the principle.

CHAPTER XV

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. It is said that there is a technique in catching and tossing hot rivets. Do you agree? Is there a technique in driving rivets? In stitching on a collar? In laying shingles? In keeping books? In writing a sonnet? What is a technique? How do you distinguish technique from technology?

2. Try this: Holding your pencil as you are accustomed to do, write your name as neatly and legibly as you can. Now shift your pencil to the other hand, holding it between the third finger and the little finger. Copy the signature as accurately as you can fifteen times. If your hand grows tired close your eyes and rest the hand. When you have completed the fifteen copies compare the first five copies with the last five in terms of quality, and in terms of ease of writing, or speed in writing. Did you improve? In what respects?

3. Try this: Draw neatly a small triangle. Look at it carefully to fix in mind its shape and size. Now shift your pencil to the other hand and *with eyes closed* draw fifteen copies of the triangle. Are the last five better than the first five in shape, in size, in accuracy of finish? Did you draw them more quickly and easily than the first five?

4. How do you explain the results in each case? (2 and 3.)

5. Read the description of a lesson in tying the Texas bowline at the beginning of section 3 of the chapter, but read no further until you have listed in order the results which the teacher designed to accomplish at each of the six stages of the lesson reported.

TEACHING VOCATIONAL TECHNIQUES

1. A girl wrapping candy boxes, a candler grading eggs, an abattoir employee cutting out pigs' tails, a cook turning pancakes, a house painter wielding a paint brush, a printer setting type, or a garage mechanic adjusting brake bands — each comes to perform the productive activities of labor in very much the same sequence and arrangement whenever he or she has the 'same job' to do. That is, the worker acquires

a method or style of performance that has, whether he is aware of it or not, order and system. The same is true with less exact recurrences of the 'same situation.' So a carpenter setting up a staircase, a dressmaker fitting a dress, a surveyor running a traverse, a surgeon removing tonsils, a lawyer preparing a brief, or a teacher conducting a recitation — each comes to 'go about his job and do it' in the same way time after time. He develops what we call a *technique*, which may be good, bad, or indifferent, but which somehow adds to the value of commodity or service.

Vocations as institutions have developed methods in the labor processes of production on the whole superior. Many farmers possess techniques in laying up walls and in hanging doors and gates, but relatively few of them conform in procedure to the pattern followed by the stone mason or the house carpenter, or do the wall-laying or the door-hanging as well. Housewives often have a technique of hanging wall paper and varnishing floors, but not the technique of the 'professional' paper hanger or painter. Every teacher who has taught a year in elementary school or high school has method-habit in conducting recitation — but not necessarily, or often, the technique of the 'professionally trained' teacher. The teaching of definite and superior operative procedure in the labor of vocation — that is, the teaching of techniques — is often an important part of the work of the teacher of a vocation group.

A line between principles and techniques, or factual knowledge and techniques, is as difficult to draw as that between factual knowledge and principles, — and as unnecessary. But again a distinction is convenient as indicative of emphasis in method of teaching. Knowledge of fact always conditions any technique, and knowledge of principle may do so. It is a fact that a particular carburetor has a milled head screw which turned affects the adjustment of the needle valve. Nobody can adjust the carburetor without knowledge of that fact. It is a principle that the intake of air and the intake of gasoline must bear a certain relation to the temperature and speed of

the engine. Knowledge of that principle may have an important bearing upon the order and pattern of manipulative activities in adjusting the carburetor, i.e., upon the technique of adjustment. Roughly speaking, then, a technique is a mechanic aspect of productive activity. A machine may run through a 'technical performance,' but it cannot know a fact or understand a principle.

2. It is usually desirable from the efficiency standpoint to reduce vocational techniques towards the machine level — to bring them to the point at which habit rather than deliberate thinking rules them. Of some consequences of such state in the worker we have already spoken. Of course in that reduction awareness of fact and governing principle sink also — so far as they condition the particular mechanized technique. A skilled bricklayer at work on a chimney neither plans nor holds a rationalizing post-mortem on every move he makes, in terms of factual cognition and conformity to principle. He does not say to himself, "This is a brick; that is a trowel; the stuff here is mortar. This brick must lap those two bricks because in all brick construction bonding is a necessary feature of strength."

Technique in conformity with fact and principle takes care of the job without any positive awareness on the part of the bricklayer that fact, principle, or habitual movements have anything to do with it. He just lays bricks; and that is not an undesirable state of affairs when repetition of the same job conditions is frequent. On the other hand conscious use of facts and principles is desirable when conditions to be met change.

Professor Starch in his little book, *Experiments in Educational Psychology*, offers a 'laboratory exercise' which is very illuminating to one who would observe the process of learning in himself — particularly the learning of a technique. It consists in tracing the outline of a star by means of reflection in a mirror when star outline and hand are hidden from direct observation. Though what is to be done is perfectly clear to the experimenter and he is sincerely desirous to follow accurately

the star pattern so plainly to be seen in the mirror, yet he finds it, at the start, and for some time, a decidedly difficult matter. His hand perversely moves as he would not have it, away from the line, and will not stop at the line when he has succeeded in checking its wandering. The result is a jagged and irregular tracing full of errors which annoyed him in the making, and of successful turnings-back which pleased him in the making. Now in the same way, with the star pattern before him in the mirror let him make a succession of tracings. Usually by the tenth tracing, and almost certainly by the twentieth, he will note a clearly observable improvement in his tracing. The off-wanderings have become fewer and the onstayings and forward-goings more frequent, so that the latter cards of tracing are much better done than the earlier cards. Moreover, he is making a tracing in considerably less time than he took at first. It is well worth any teacher's time, if he has never done so, to undertake this 'mirror drawing.' It will teach him more of the process of learning than he can acquire in hours of reading about it.

Against this it may be worth a few minutes of time to try drawing with his eyes blindfolded a succession of circles, or triangles, or squares — say twenty or more — as carefully as he can, and then to uncover his eyes and see if he can discover any improvement of his drawing of the figure as a result of practice, i.e. if the latter circles are better circles than the earlier circles. He is quite certain to find that 'going it blind' without the opportunity to check his successive drawings against the pattern he has in mind has produced no improvement whatever. In the mirror drawing he has, so to speak, a target to shoot at and a tally of his hits and misses. In the blindfold drawing he has from past experience with circles, or triangles, or whatever he has chosen to draw, a target (in mind) but no tally of shots — and he does not improve. Analysis of the mirror drawing case, of the blind drawing case, and comparison and contrast of the two cases will suggest the principle which governs all successful teaching of techniques.

3. The principle may be illustrated by report of the procedure of a successful teacher in teaching twelve boys to tie a 'Texas bowline.'

First:—Standing close before the boys the teacher threw his rope over a post and tied the knot rapidly. Then he 'illustrated and explained' the function of the knot, e.g. — by pulling to show that it did not slip, by loosening it, by suggesting the contrast between it and the familiar slip noose, in tying a horse. Next he called upon the boys to look the knot over from four sides and from above and below, and to test for themselves its non-slipping and easy loosening.

Second:—Facing the boys, but turning to show each feature from all sides, he 'built up' the knot very slowly, exhibiting its features one by one, e.g. — loose end, standing end, bight, loop, etc. Then, still exhibiting the knot he called upon the boys to find in a descriptive bulletin provided each of them the sketch of each component of the knot, and to point out the parts in the completed knot and the sketch of it.

Third:—Reversing his position so as to face with the boys instead of toward them the teacher tied the knot several times in 'slow movie' fashion without any breaking up of the process into steps.

Fourth:—Standing in the same position the teacher tied the knot slowly, step by step, pausing at each step to call attention to the features of the process, e.g. — position of hands, rotation of wrist in making loop, how the adjacent lines of rope fall together, etc. This he repeated several times, in the latter two repetitions calling upon the boys to direct him in the successive steps.

Fifth:—The teacher supplied each boy with a ten-foot length of rope and called upon him to tie the knot step by step, pausing at each step to allow the product to be examined by the teacher and to repeat the step under the eye of the teacher. Thus each boy tied the knot several times, until in detail of process and product it met the approval of the teacher. Those

first successful were called upon as helping critics to the less successful.

Sixth:— The teacher asked the class to tie the knot while he counted to twenty. The two or three who had not succeeded in that time he required to start again with the rest on the second count of twenty. With the third count of twenty all succeeded in completing the knot satisfactorily. The teacher then changed the count to fifteen; and again to ten. The two or three who did not finish in the third count of ten, the teacher assigned later practice. Before starting instruction on the halter tie he declared a brief recess.

Description makes the lesson appear very formal, because, as has been noted, description is selective. In reality no boy seemed aware of formality in the lesson. To a boy it might have appeared, if he were asked, that the teacher did something like this:

Showed us what the Texas bowline looks like and what it's for.

Showed us the parts of the Texas bowline.

Showed us how an expert ties it.

Showed us the steps in tying it.

Helped each of us to go through the steps correctly.

Gave us enough practice so that we could run it off without thinking about the steps.

In more general terms we may say that the teacher:

A. Showed the product to be made as it looks and is used.

B. Showed and explained how the product is made (from the point of view of an observer.)

C. Guided the pupils to discovery of 'the feel of the job.'

D. Conducted drill in the job until the process reached a habit stage.

Still more abstractly the procedure of the teacher may be regarded as indicating a general plan:

A. To furnish an objective pattern of the product of the technique — or to make clear the purpose of the technique.

1. As a whole.
 2. In its significant parts or features.
- B. To furnish an objective or observer's pattern of the technique itself — or to *demonstrate and explain* the technique.
1. As a whole.
 2. In its significant parts or features.
- C. To develop a subjective or participant's pattern of the technique — or to *supervise trial* of the technique.
1. In terms of its components.
- D. To strengthen the habit-whole of the technique by satisfying repetition — or to *direct practice* in the technique.

Every one of these features of method — clarification of purpose, demonstration and explanation, trial, and practice — is appropriate and valuable in the teaching of a technique of vocation, whether it be making a lawyer's brief, conducting a recitation, wiping a joint, stitching a seam, or wrapping candy boxes. They need not, of course, stand out as distinct steps — rather, as in all good method, they should fuse into an integrated whole. But each represents a contribution to the forwarding of economical learning of vocational techniques.

Often, of course, a pupil can follow through a series of commands or explicit directions and come out with a result the like of which he did not contemplate, so that he learns what the technique is for after its performance. There is still teaching of the sort to be found. A record of observation in vocational schools shows three cases wherein pupils in woodworking classes have, after an hour or two of following directions, ventured to ask their teacher what it might be that they were making. But that sort of teaching is very rare. It is not customary to undertake the study of brief making in terms of demonstration, trial, and practice until the student knows in some fairly clear fashion what a brief looks like and the purpose it serves. Nor is it a habit of the practical teacher to set a pupil to laying bricks who has no idea of the character of a brick

wall. So often the product, in whole and purpose at least, is a familiar thing that teachers may omit any formal heed of it in teaching; but if this becomes habitual with the teacher it may lead to difficulties such as occur sometimes in the assumption that the pupil is familiar with the nature and purpose of the commodity or service to which the technique is appropriate, e.g. — as when the teacher of agriculture assumes that all his boys know the purpose and character of a poultry feed hopper before they start to make it, when there may not be such a hopper in use within five miles of the school. In any event it is a useful precaution and a distinct contribution to favorable specific mind-set for study that the teacher recall to mind among his pupils or show the utility product in which a technique eventuates before he attempts either to demonstrate that technique or to put the pupils through the performance of it. Otherwise his demonstration may be, for some of his pupils, at least, like the performance of the 'lightning artist' on the vaudeville stage, a lot of strangely interesting doings which have no head nor tail to them till the artist turns the black-board upside down and shows that it all comes to a picture of Abraham Lincoln. That is, the order and arrangement of details of the demonstrated technique mean very little because the pupil is not aware of what they are coming to. By the same token trial is likely to be a forced rather than a purposeful affair on the part of the pupil. In sum a clear conception of 'what this all is driving at' is quite as essential in teaching techniques as in any other kind of teaching that depends on the stimulation of intelligent activity. To allow the pupil, or compel him, to 'go it blind' is fairly good insurance that his activity will not make for improvement.

Occasionally teachers are content to show the final product of a technique — say a Morris chair, a school dress, or a 'lesson plan,' and to set the pupil the 'problem' of making one like it. From some points of view such a method has merit. But from the point of view of teaching a superior vocational technique it is, at best, a wasteful method. There are many ways of

skinning a cat. When we have furnished the pupil a sample of skinned cat and a knife we have not any assurance at all that he will skin the cat he has yet to catch by the method which we regard as superior and wish him to acquire. For the superior technique is not necessarily revealed even to the most earnest student by the completed product of it. Economy in teaching superior technique demands that the pupil shall be provided with a pattern of that technique.

So far as 'getting across' a pattern of technique by demonstration and explanation is concerned the teacher has to make his appeal through the eye mainly and through the ear in accessory suggestive fashion. In most cases he does, as did the teacher of the Texas bowline, two things: shows the process in whole and in detail, and calls attention to its significant features by words. In the teaching of manipulative techniques this is the method probably most appropriate to objective pattern setting. It implies three precautions on the part of the demonstrator — that he shall provide that all pupils may see his performance from the approximate angle at which they will view their own when trial and practice come; that he shall speak so distinctly and clearly that all may hear and understand what he says; that he shall set up no competition between his showing and his speaking, so that the pupils' attention may not be distracted from what he is showing by what he is saying, nor from what he is saying by what he is showing. One of the most frequent faults of the objective demonstration is that the demonstrator keeps up a constant flow of talk as he demonstrates. In 'team demonstrations' for the purpose of 'educating the public' it is not uncommon to find a close parallel to the three-ring circus. There are so many interesting things going on at the same time that we cannot follow them all at once.

In some techniques actual demonstration of the process may be substituted by a 'following through' with explanation of the details of the product. So, in teaching the techniques of accounting, the teacher may not write out item by item before

the eyes of his class a debit-credit statement, but instead may take a prepared statement of the sort and go through it 'analytically and synthetically' with the class — which is nearly, if not quite, the same thing as making up the statement himself. His selective habit, which cannot be observed, is so preponderant over the manipulative features of technique, that the omission of such from the demonstration-explanation leaves no serious distortion in the pattern.

To see the product and to examine it, to see the teacher's performance and to hear his explanation is not to get 'the feel of the job' — what we have called the subjective pattern of the technique. It is plain enough that to see a skilled mason lay bricks and hear him explain the process is not the same experience as to lay bricks oneself. To observe a recitation lesson and to hear a critical explanation of it is not, by any means, the same experience as to conduct such a recitation oneself. It is as if the reader were to regard looking at a star in a mirror and reading certain paragraphs of this chapter as an experience equivalent to tracing the mirror drawing. If he has tried the two experiences of the learning of techniques he knows that they are decidedly not the same. This obvious and significant distinction implies that trial must supplement demonstration if other senses than those of sight and hearing are involved in the technique. In all manipulative techniques we know that the touch and kinesthetic senses play a part, and further that muscular activity with its concomitants of feeling is involved in every technique from tool sharpening to the making of orations.

Just as in the mirror drawing the tracer of the star checks his moves by the outline before him so the pupil may be guided in his trial by the mind pattern of product and process furnished by the teacher to him as observer. Thus the subjective or feeling pattern is conditioned by the observed pattern in so far as the pupil in performance can observe himself as he observed the teacher and the product. So, for example, a boy attempting for the first time to fit and file a saw after demon-

stration may check his results in bevel and set by reference to the properly fitted saw; may check the position of his hands on the file by reference to the method shown by the teacher; and so come to an inner sensing of those details which is a correct and useful pattern for guidance. But there are some features of saw fitting and filing, even, which neither the saw nor the teacher can show him. For instance, the teacher may have said during his demonstration, "press the file firmly, but not too hard." Neither teacher nor saw, but only his own pressing of the file, can enable him to arrive at a proper, or any, pattern for what is pressure, "firm but not too hard." The teacher may go so far as to lay his hands on those of the boy who holds the file in position in order to 'give him an idea' of about how hard to press. Now since a wrong pattern will serve just as effectively to direct technique as will a right pattern — since one may be 'just as good' to the learner as the other, it becomes very important that the first attempts at performance of the technique shall be closely supervised, so that as little distortion of the correct pattern as possible may result.

It may appear to some readers entirely artificial to interject a stage of *trial* between demonstration and practice. Of course, any trial is a stage of practice, even the first; any practice performance is a trial, even the thousandth. But it is well to emphasize that the early stages of practice, which we have here called *trial*, determine very much, because of the pattern they set, the character of future performances which we have called *practice*. These latter practice performances through repetition in conformity with a satisfying pattern tend increasingly to fixation of the technique on the automatic habit level, with decreasing awareness of the pattern factor. Hence trial and practice are only suggestive of differences in emphasis upon the educative factor in early and late performances for the acquirement of technique. If the distinction serves no more than to change the attitude of the teacher it is worth while. So, a teacher who thinks of early practice as *trial* for the ac-

quirement of correct pattern of technique will hardly take the attitude revealed in the command, "Go ahead and do it for yourself now. I've shown you how, and you'll have to do the best you can. I've done my part." Nor is a teacher who thinks of practice as means to confirming the method-habit of technique likely to assume, as many college teachers are accustomed to assume, that a demonstration and explanation of a technique teaches the technique, so that those who have watched how it is done and heard how it is done can now do it, the teacher's responsibility in the matter having ceased.

Now, as those who have tried the mirror drawing and the 'going it blind' have noted, demonstration, trial, and practice are merely means to the ordering of *discovery* and *use of the thing discovered*, once more. In this case the pattern of the technique is first discovered, then put to use in the direction of performance in practice. Just as when the tracer of the star in departing from his pattern was annoyed and in returning to it pleased, so in performance detail the learner is annoyed as he fails to conform to the pattern in his mind, or 'does it wrong,' and satisfied as he conforms, or 'does it right.' Just as in the mirror drawing satisfying or correct adjustments become relatively more and more frequent as practice goes on, and annoying or incorrect adjustments less and less frequent, so improvement in technique comes with repeated performance made satisfying in its correct details by an established pattern or specific mind-set. The learning of technique invokes no new laws of learning.

SUMMARY ABSTRACT

1. A technique of production is a system or style of process performance made habitual. Vocations are characterized normally by orderly systems of process performance in production, i.e. by vocational techniques. These techniques are in general superior to those of the layman who may undertake the same job, and accordingly become assets of the efficient producer in the vocation.

2. The mode of learning a technique is illuminated by the 'laboratory exercises' of 'mirror drawing' and 'blind drawing.' These reveal that

the mode is one of 'trial and error' or 'trial and success.' Error is checked or made annoying by recognized departure from the guiding pattern. By repetition errors become less and less frequent, successes more and more frequent.

3. Accordingly the method of teaching a technique consists in providing:

- a. A guiding pattern of the process
 - (1) From the observer's standpoint.
 - (2) From the performer's standpoint.
- b. Repeated successful performance of the process.

Or, stated in terms of the teacher's procedure:

- a. Demonstration of the technique (Exposition-explanation).
- b. Supervised trial of the technique.
- c. Motivated drill, or practice in the technique.

CHAPTER XVI

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Call to mind someone whom you regard as a reliable worker. Just how did you arrive at the judgment that he is a reliable worker? Suppose a friend asks you to 'keep an eye' on so and so to find out whether or not he is an industrious worker. Just what will you 'keep an eye' on?
2. You were born neither honest nor dishonest. How did you learn to be honest?
3. What would you suggest as the essential means to teach a boy to be just and fair in his dealings with his fellows?

TEACHING VOCATIONAL 'HABITS OF MIND'

1. Popularly a man is said to be qualified for his job when he knows its 'whats,' its 'whys,' and its 'hows.' In a rough way that classification and the one we have made thus far of learning are in parallel. I.e. — knowledge of vocational facts is 'the what' of vocation; insight into vocational principles, laws, standards, and ideals, is 'the why' of vocation; habituation in the techniques of vocation is 'the how' of vocation. The artificiality — not the uselessness — of either classification appears in the exclusion of such motivating dispositions or characters of mind as are suggested by the terms reliability, industry, loyalty, inventiveness, open mindedness, and sense of justice. These relatively general and 'permanent attitudes' or 'habits of mind' are manifestly significant to vocational efficiency and appreciation and to institutional and socio-economic stability and progress. Inasmuch as they are undoubtedly developed from original capacity, or learned, they become proper aims in vocational education. They affect the producer's dealings with facts, his understanding of and govern-

ance by principles, his development of and use of techniques. But though they are realities they are not external and environmental, and can hardly be classed as vocational facts; they govern reaction to variant situations of a kind, but they are not clearly conceived and explicit generalizations of the intellect, and hence hardly fall into our second category; they are or they determine habit-modes of production, but they are not ordered, systematic, and definite enough to be classed as techniques. Thus, as aims, they do not furnish the specific guidance to teaching situations or method that is furnished by such aims as knowledge of the mark on the flywheel, understanding of the principle of the cycle, or method of adjusting the brake bands on a Buick.

Nevertheless, as with knowledge of facts, understanding of principles, mechanized response in techniques, we do know something of the conditions under which they develop. In method of development, perhaps, they come nearest to principles because they call for use by the teacher of similar situations with varying concomitants. Observation, of course, may play some part. So, for example, observation of cases of dependable action, perseverance in productive work, adherence to the productive organization, discovery of new means to production, apparently unprejudiced consideration of alternative proposals, impartial fair dealing, may well prove suggestive of the common elements in external behavior that may be classed as reliable, industrious, loyal, inventive, open minded, just. But so much are these dispositions bound with and conditioned by direct activity in vocational affairs that we can hardly depend upon precept and example for the development of them. A man does not become reliable, industrious, and loyal by witnessing and approving the reliable, industrious, and loyal behavior of another, but by behaving himself in reliable, industrious, and loyal fashion; he does not become inventive by observation and approval of Edison, but by discovering for himself 'new ways of using old things' — ways new to him, at least: he does not become open minded and

just by observation and approval of some modern vocational Socrates or Aristides, but by behaving himself liberally and justly in vocational or economic affairs.

It is clear, then, that administrators and teachers together in any 'school' for the preparation of economic producers should coöperate to provide participation by pupils in genuine and responsible fashion in problems and tasks of vocation that involve dependable behavior, industrious behavior, loyal behavior, inventive behavior, open minded behavior, just behavior, and so on. Any teacher who knows the vocation in which and for which he educates his pupils can list type situations in which the capacity for dependability, for industry, for loyalty, for inventiveness, for open mindedness, for justice is normally stimulated if it be present in the participant. So can any vocational school director who is fit to direct the school which he administers. But neither teacher nor administrator alone can organize and make accessible to pupils all the resources of vocational experience which the school and the community offer.

Much has been done in this direction already. The so-called 'part-time' and 'project' systems of vocational teaching exemplified in college instruction-hospital work for medical students, college instruction-engineering employment for engineering students, college instruction-apprentice teaching for prospective high school teachers, school instruction-shop employment for mechanics, school instruction-home projects for girls in home economics courses, school instruction-home projects and farm employment for prospective farmers, and the like, — these are in line with recognition of the principle of active learning in active producing under the conditions of vocation and economic life. They may be used not for the teaching of vocational facts, principles, and techniques only, but also to development of the habits of mind of the dependable, industrious, loyal, inventive, open minded, or just worker.

All this is not remote and abstract but very readily to be translated into functional teaching. Consider, for example,

the case of a boy who desires to become a poultryman. He attends a high school and enrolls in a poultry course organized on the project system. Here are samples of easily provided experience which involve the dispositions to dependability, industry, loyalty, inventiveness, open mindedness, justice. At least within the problems of his poultry raising opportunity is offered for manifestation of the desirable traits.

1. As a member of a coöperative poultry association among the boys of the school he is called upon to deliver every other day throughout six months not less than four dozen first grade eggs laid within sixty hours of delivery to the selling agent of the association.

If he does so he certainly displays dependability.

2. As owner and manager of a flock of one hundred hens he obligates himself to rear fifty pullets for replacement purposes, to feed regularly, water regularly, clean and disinfect pens regularly, collect eggs regularly, and so on according to a scientific and progressive system of management.

If he does these things he certainly manifests industry.

3. As a member of the coöperative association he refuses to sell his eggs to a local buyer who offers a higher price than does the coöperative.

If he does so he displays loyalty.

4. He works out and carries through a plan for the economical reorganization of the poultry plant on his home farm.

If he does so he manifests capacity for invention.

5. As judge he selects the best pen in a show in which other breeds than that which he keeps are exhibited.

If he does so he manifests open mindedness.

6. As arbitrator he acts to settle fairly a dispute over replacement between the purchaser and the user of hatching eggs.

If he does so he manifests a sense of justice.

Now multiply the variety of such experiences within the field of his school and farm experience as a prospective poultryman and we have done a good deal to make him a dependable, industrious, loyal, inventive, open minded and just poultry-

man. We have not made him dependable in all the relations of life, nor industrious in all kinds of work, nor loyal to all sorts of institutions, nor inventive in all ways, nor open minded with respect to all propositions and events, nor just in all his dealings with men and women throughout life. It is foolish to assume that we can or should do so in directing his experience to qualification as a poultryman. But we have done our part in contributing to the more general manifestation of virtuous dispositions called by such names.

SUMMARY ABSTRACT

1. There are certain 'dispositions' or 'habits of mind' that contribute to vocational efficiency and appreciation, which lack the definiteness of factual knowledge, the system of habitualized techniques, and the intellectual clarity of principles. Such are of great importance and should be developed in teaching. Since they are in some measure general they approach in psychological character principles and ideals, and may be developed by similar methods. At least they imply the use of type situations with varying concomitants. Use, however, must be primarily participative rather than observational. Education which is designed to prepare an individual to be reliable, industrious, loyal, inventive, open minded, just, and the like in affairs of vocation and economic life, must provide not only precepts and examples of such virtues, but also, and primarily, provide for reliable behavior, industrious behavior, loyal behavior, inventive behavior, just behavior, etc., in type situations of vocation and economic life.

CHAPTER XVII

METHOD IN VOCATIONAL PREPARATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Suppose you spent an hour in visiting a school which offered courses (a) for cabinet makers, (b) for poultrymen, (c) for printers, (d) for housewives, and that you noted the following with respect to 'vocational classes':

- (a). A class of young men in the school shop each at work on a piece of furniture of his own design and making; the teacher standing by as consultant.
- (b). A class of young men engaged coöperatively in the construction on the school farm of a four section 'laying house'; the teacher 'bossing the job.'
- (c). A class of young men engaged in setting type for a school bulletin, each working on the same amount of copy, or an equal share of the total copy for the bulletin; the teacher being absent.
- (d). A class of young women engaged in fitting partially completed dresses of their own design and make and for their own use; the teacher acting as critic and assisting in such matters as pinning and marking.

If at the end of your brief tour of observation the principal asked you for a frank statement of your impression concerning the methods of teaching, what would be your answer? Why? If he asked you to make suggestions for the improvement of teaching what questions would you ask him before venturing suggestions?

2. Suppose that you had found instead the following among the 'vocational classes':

- (a). A class engaged in recitation from a reading on the structure and arrangement of the medullary rays in hardwoods.
- (b). A class engaged in taking notes from a lecture on the extent and importance of the poultry industry in the United States.
- (c). A class engaged in writing a composition upon the life of Benjamin Franklin.
- (d). A class engaged in pasting advertisements of foods, cut from the popular magazines, on large card boards to serve as posters.

EDUCATION AND VOCATIONS

Would you report the same or a different impression to the principal? Would you ask the same questions before venturing suggestions? Why? A teacher who was asked why he had just spent four weeks in conducting practice with a stock judging team in order that his school might be presented in a stock judging competition at the state fair said: "I know no better way to develop initiative, self-confidence, the spirit of cooperation, fairness, and manly character in my boys." What criticism would you make of his reasons for 'training a judging team'? List the three factors that you would give most weight in judging the merit of method in any case of 'vocational teaching.'

CRITERIA OF METHOD

The final test or measure of the worth of method, whether in education or in material construction, is the product which results from it. But the product cannot guide us in estimating method as an ongoing process, because the product does not exist till the method-process is done. Now the product of vocational preparation is the worker at work efficiently and cooperatively in economic service. But the pupil with whom we deal as educators is not the worker-product; he is the worker in process of becoming efficient and appreciative. Hence we judge of methods in terms of an aim or contemplated result rather than by the accomplished result.

Our ultimate aim, as has just been suggested, is, so to speak, the complete producer in service. That aim may serve to unify the general plan and outline and execution of method in vocational preparation. Thus we may say that the prospective engineer, teacher, farmer, homekeeper, mechanic, or machine tender should learn with the mind-sets of engineer, teacher, farmer, etc.; should be subject to the stimuli to which engineer, teacher, farmer, etc., is to be subject; should be active in the manner of engineer, teacher, farmer, etc.; and should accomplish results like to those accomplished by engineer, teacher, farmer, homekeeper, mechanic, or machine tender. In brief summary: method in vocational preparation is sound in the degree that the motives, undertakings, activities, and accom-

plishments of the learner approximate those of the efficient and appreciative producer whom we have in mind.

2. That, however, does not tell the whole story. There are activities in which the learner must engage which are not stimulated by like stimuli, nor carried through in like manner, and which do not eventuate in like results to those of the finished producer. In the larger patternings of method after the vocation-mode of the producer are details which are not included in the model pattern. A farmer, for example, does not include among his vocational activities, either of pursuit or calling, those of observing and recording the movements of soil water in tubes of soil. But such may be entirely appropriate activities for the pupil preparing to become a farmer. What he learns of fact and principle thereby may function to efficiency or appreciation in vocation. What he learns of the technique of observation and record will probably not function at all. In the same way students of engineering, medicine, home economics, or plumbing may undertake readings, summarizings, reportings, and discussions of a kind which as engineers, physicians, homekeepers, or plumbers they will never be called upon to undertake either to perform successfully or to appreciate fully their vocations. There are, that is, elements of learning conditional to vocational activity which are not to be learned by following the exact mode of vocation, and without which that mode cannot successfully be used as the method of vocational preparation. Much may have to be learned in preparation for vocation that can later be discarded and forgotten without loss either to vocational efficiency or vocational appreciation. So, the successful farmer can entirely forget the particular grades of soil, and the heights and rates of capillary movement in the several tubes, by observation and record of which he learned, or was introduced to, the principle that in soils of fine texture (heavy soils) water rises more slowly but to greater heights than in soils of coarse texture (light soils).

Good method in vocational preparation, then, is not wholly a matter of stimulating activities of vocational order made

satisfying by vocational motives and vocational results. It is rather founded upon a clear conception of results in desirable vocational skills, knowledges, and attitudes. If the motive-activity-achievement process of learning is appropriate to these particular aims the result will fit with the larger pattern of the efficient and appreciative producer.

Professor Kilpatrick in his recent book, "Foundations of Method," emphasizes the point that in teaching to a specific end we never evoke solely the appropriate activities nor effect solely the result we seek. That is, in hewing to a line the chips do fly. What kind of chips they are and how they fly are not matters of indifference. When we are teaching, the pupil is always learning something besides and other than that which we teach him. That other may be good, it may be bad, or it may be of no consequence. His point is well taken.

Our schools, however, including vocational schools, have in them some teachers to whom the suggestion may be too comforting. They are already working with so much thought for the chips and how they will fly that they have forgotten the cut they have to make. They are so much concerned with real and mythical by-products in learning that they have forgotten about teaching. A pupil may learn a great deal while the teacher is about and active, and yet not be taught anything — just as he can learn a great deal from dealing with a frisky colt or a balky 'flivver,' but yet cannot rightfully blame or praise the colt or the 'flivver' as his teacher. A teacher does not teach unless he stimulates his pupil to the kind of motive-activity-achievement which results in the change of behavior which he designed to bring about. Teaching implies a contemplated product in learning, not a lot of by-products that may possibly be worth something.

That is a reiteration of what we have said before. But it is the foundation of teaching method, as against mere process of learning. It is no empty statement that half the battle of method is won when the teacher knows just what he seeks to accomplish. If I, as teacher, know just what fact in just what

associations of mind-set and environment I wish my pupils to learn, I am not badly prepared to teach that fact. If I, as teacher, know just what principle in just what associations of mind-set and environment I wish my pupils to learn, I am more than ordinarily well equipped to teach that principle. And so on.

For a fact learned in certain associations is a fact discovered or used in those associations; a principle learned in certain associations is a principle discovered or used in those associations. Knowing where I want to go I have more than a 'hunch' as to how to get there. Provided, of course — and this is a very important proviso — that I know where I am starting from. For the other datum of method is the pupil — where he stands *now* in experience of the things with which I would have him deal. New experience is, as Professor Dewey says in effect, "reconstruction of old experience." What the situation shall be that I, as teacher, design to use to achieve my end in the pupil's learning depends quite as much upon the pupil as upon me and my external resources. For, as we have noted, the learner is both of and in "the situation to which we would have him react." Hence the teacher must consider not only what he would have the pupil become, but what the pupil is now, before he undertakes to accomplish his aim, i.e. to teach.

SUMMARY ABSTRACT

1 Method in vocational teaching should in general approximate the motive-activity-achievement pattern of vocation.

2. But there are aims of vocational teaching to which the pattern is not appropriate. Good method consists in stimulation of a motive-activity-achievement process appropriate to the clearly conceived objective. By-products of teaching should be considered. But the desired product should determine methods, not the by-products. What the pupil learns by virtue of the doings of the teacher and what the teacher teaches him are not always and inevitably the same. Half the battle of method is won when the teacher knows exactly what he desires to accomplish. And a good share of the rest is won when the teacher knows the pupil as he is.

CHAPTER XVIII

PROBLEMS OF POLICY

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. When one has made up his mind to prepare for a given vocation he should have the opportunity to give, as nearly as possible, his undivided attention to that preparation until such time as he shall have attained the desired qualifications or shall have demonstrated his incapacity to do so. What do you say?

2. The first requirement for the establishment of effective vocational education is a clean cut divorce of vocational courses from the influence of 'academic interests.' What do you say?

SEGREGATE VERSUS 'BLENDED PROGRAMS'

1. Differences of policy in specific vocational preparation are manifest in two types of school organization. In the first the pupil is directed exclusively in educative activities appropriate to his needs in vocation. In the second the 'vocational course of study' is part of a 'blended program' of studies.

'Trade schools' and 'graduate professional schools' often exemplify the first plan. The trade school gives the prospective printer or loom operator that training and instruction only which prepares him for the work of printing or of loom operating. The graduate school of law or medicine provides a grouping and sequence of studies clearly related to law practice or medical practice, and none other. In either case the educational needs of the student apart from vocation do not concern the vocational school.

On the other hand, in public high schools, technical schools of secondary grade, and undergraduate professional schools the vocational course of study is often part of a 'vocational curriculum.' The prospective dairy farmer in the agricultural curriculum of the high school follows such studies as English

literature, community civics, general science, and history, not because they contribute notably to effectiveness and enjoyment in producing milk, but because they are assumed to have value in the life of the man who lives on a dairy farm. The prospective civil engineer in the engineering college may be required to study arts and sciences that have little to do with the profession which he will follow, but that are supposed, nevertheless, to have some function in the life of the civil engineer.

The first advantage of the segregate vocational course, according to the proponents of that plan of organization, lies in the *concentration* of the efforts and interest of the student. A good school patterns its activities after those for which its pupils prepare. Efficient men in vocation do one thing at a time and see it through. "Five hundred hours," says Doctor Snedden, "of such concentrated vocational training will mean much more, certainly, for efficiency and morale in most vocations, than two thousand hours distributed over several years of a blended program."

The proponents of the second plan maintain, however, that life itself is a 'blended program.' It is not divided into compartments into which men may move at will and 'concentrate' for uninterrupted stretches of time. No man spends five hundred hours at vocation exclusively, then a hundred hours at golf exclusively, a hundred hours in concentrated home duties, twenty hours in consistent pursuit of his bathing interest, ten more in deciding how to vote, and so on. Not even does he concentrate his 'fifteen minutes a day' with the classics in one glorious week's orgy of literature. On the contrary everybody faces problems in several categories every day of his life. Efficiency consists as much in versatility as in prolonged concentration. The lawyer, the mechanic, or the farmer must be ready to shift his attention and his effort as occasion demands. Segregate concentration is not conducive to versatility in adjustment, the 'blended program' is distinctly conducive to it.

Further, say the proponents of the 'blended program,' that prolonged concentration makes for efficient production, does not at all prove that prolonged concentration makes for efficiency in learning. There is evidence to the contrary. For example, it has been proved that forty hours of concentrated practice in typewriting is less effective than forty hours distributed over a period of weeks. Fatigue and forgetting are factors in learning that do not support segregate concentration of the type approved by Doctor Snedden.

There is need of further sociological and psychological evidence. Many vocations have scope probably sufficient to allow of rather prolonged concentration without loss of efficiency in learning. That a greater concentration than is now common may in certain fields be profitable is indicated by the apparent success of the 'Dalton plan' and the more evident success of graduate professional schools. The continuous and exclusive pursuit of a single study, nevertheless, is hardly to be justified by present knowledge of the life pattern in most vocation-modes or by the known factors in learning.

A second advantage of the segregate organization is frequently mentioned in discussions among administrators of vocational education. That is freedom from 'academic influence.' Tradition is powerful and it interferes with the free and appropriate development of vocational education. The school man of the established order is unwilling to cooperate in forwarding the development of effective vocational preparation. Hence to cut loose from his influence is necessary.

To this the proponent of the 'blended program' replies: Such an attitude and policy are in themselves as detrimental to the progress of a democratic system of education as is the dead hand of tradition. It represents a philosophy of dualism which sets off vocational education from and in opposition to other education. It assumes that vocational education has nothing positive to learn from the experience of school men, and that it has no duty to contribute to the betterment of the existing system. To blend vocational education with the

general program is to benefit both. Not all that school men have learned is futility. There is more to coöperation than getting the other fellow to do as you wish. If the traditions of 'discipline and culture' weigh heavily it is not because they are ignoble or unworthy, but because they are traditions. School men are bound not so much by prejudice as by the demands of the public whom they serve. So long as the public favors a minimum per capita cost in schools and cares little what is taught, so long will school men use studies that call mainly for cheap teachers and cheap books. Progress in the schools comes by evolution not by revolution. Vocational education has a duty to speed that progress, not by escaping from 'the world, the flesh, and the devil' of school facts and tradition, but by living with them and dealing with them. If as a blended part of the program of public education it demonstrates the value of specific and democratic objectives, active and genuinely motivated learning, and the integration of the resources of the school with those of the community, it may leaven the whole process of public education. It is pharisaical to brand the school man as a Pharisee. To do so is to perpetuate the institutionalism with which he is charged and to initiate the same sort of institutionalism in vocational education.

Within certain bounds, at least, a specific vocation may imply a *mode of life* different in its demands from that which accompanies another vocation. The life needs, apart from vocation, of the dairy farmer are not all identical with those of the lawyer, the stenographer, the locomotive engineer, and the elementary school teacher. It is probable, too, that the physician, the stock-broker, the construction engineer, and the college professor will live in surroundings and associations outside of vocation which are not similar in all essentials. But the elementary school, the high school, and the arts college are charged with teaching men 'how to live' in the absence of knowledge of the particular kind of life that each will probably live. Therein is one of the weaknesses of our present system. We educate for life in general, which nobody leads, as we are

bound to do so long as no definite prognosis is made for groups and individuals. Specific choice at the stage preparatory to vocation, however, makes possible quite definite prognosis.

With one who has entered upon a college preparation for the vocation of civil engineering, a high school preparation for that of dairy farming, or a trade school preparation for that of plumbing, we can be sure that before him are certain extra-vocational problems not those of every man and woman. To prepare him specifically for his mode of life calls for a 'blended program.'

SUMMARY ABSTRACT

1. Preparation for vocation may be offered in a 'vocational course' to which the student devotes his whole time and attention; or the 'vocational studies' may be within a larger program of studies some of which the student follows to other ends than vocational efficiency and appreciation.

The segregate 'vocational course' is held to have these special merits:

- a. It is consistent with *concentration* of interest and activity to the advantage of learning.
- b. It conforms with the pattern of the efficient producer, who concentrates on his producing to the exclusion of other activities and interests.
- c. It frees teaching from undesirable 'academic influences.'

The 'blended program,' on the other hand, is supported on these grounds:

- a. It provides for a change of activity and interest that diminishes the influence of fatigue, and thereby contributes to advantageous learning.
- b. It approximates the pattern of daily living in the vocation-mode of the producer, which is not a concentration on producing only, but a complementary sequence of producing and leisure activities.
- c. That it makes for prevention of an unnatural and undemocratic dualism in education.

CHAPTER XIX

PROBLEMS OF POLICY

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. The heterogeneous mixing of pupils of divers interests in our American high schools and universities is the chief cause of their inferiority to the European secondary schools and universities. Every move to the segregation of the like minded in education makes for development of a superior leadership — a leadership of which democracy is sadly in need. What do you say?

SEGREGATE VERSUS 'MIXED' SCHOOLS

1. Differences in policy are again manifest in the physical segregation of institutions of preparation for vocations. We have on the one hand schools responsible to no others and set off by themselves. Such are secondary schools of agriculture and homemaking, secondary technical schools and 'institutes,' trade schools, normal schools, the 'A. and M. colleges' in many of our states, private engineering and medical colleges. Any one of them may support either a strictly vocational or a 'blended program' of studies, but plant, staff, and students are segregate from all other institutions of learning. On the other hand we have schools within schools, such as the public high school with its vocational divisions in agriculture, trades, and 'business'; the state college with its schools of agriculture, domestic economy, engineering, and 'education'; and the university with its associate colleges of arts, engineering, medicine, law, theology, journalism, commerce, 'education,' etc.

The first advantage argued for the special vocational school is that of location. To secure contacts with industry and to serve the largest numbers it must be *accessible* to the environment of vocation and to those who gather in that environment.

Thus a school for marine vocations must be located in a port, a textile school in a textile center, a school of medicine in a city well equipped with hospitals, an agricultural college in a farming country, a school for industrial chemists at a seat of chemical industry, and the like. The school not so located is enormously handicapped in the attempt to keep pace with the advance of industry through constant reduplication of costly equipment and is further not so easily accessible to its major clientele as the well located special school.

The force of the argument is not weakened by the fact that many special schools are not well located. For it is a simpler matter to locate a vocational school favorably to the needs of its pupils than to locate a high school or university with equal reference to the needs of all its divers groups of pupils. Moreover, most of our high schools and universities are already located without any reference to the needs of specific vocational groups. If a vocational school be set up within the established organization it must face the disadvantages of a possibly unfavorable location.

A second advantage is said to lie in the association of the like minded. The 'professional attitude' is thereby developed. The *morale* of the homogeneous group in the special school is higher than that of the heterogeneous groups in the 'mixed' school. Extraneous factors are not disturbing and the educative process goes on with smooth efficiency.

The school within a school, however, is not now or of necessity always located unfavorably to "vocational contacts" and access to its clientele. If it be unfavorably located with respect to one group of vocations it may be favorably located with respect to another. The university in the small town may be poorly located for a school of medicine but admirably located for a school of veterinary science; the university in the great city may be well located for a school of electrical engineering but badly located for a school of agriculture. Certain high schools are well located for the teaching of fruit growers, others of dairy farmers, others of plumbers and electricians, others of

stenographers, others of designers and pattern makers, and so on. If every coordinate grouping of schools will undertake to prepare students in those vocations only for which it is well placed the ends of efficiency will be quite as well served as by special schools which divide their labor on the same principles. There is no inherent reason that a medical school in an urban university or an agricultural department in a country high school should lack the "adequate vocational contacts" of a segregate college of 'physicians and surgeons' in the same city or a special county or state school of agriculture in the same village.

The segregation of an 'interest group' from contacts with those of other interests is, from a democratic standpoint, the most serious weakness of the special school. It is not an argument for, but one against the special school. It tends to weaken the bonds of larger social integration. The policy reflected in the development of special segregate schools is, as Doctor Dewey has so admirably shown, thoroughly "undemocratic."

The superiority of the 'mixed' school is "not so much a matter of studies as a matter of *contacts*." All the assumed benefit of increased 'morale' through specifically appropriate studies pursued by a group looking toward a common vocation-mode may be preserved in an organization where contacts, if not studies, are common to groups of diverse and specialized future vocations. If, in the university, the prospective teacher, research worker, journalist, engineer, physician, lawyer, statistician, farm operator, pastor, and stock-broker, may mingle as fellow members in a greater confraternity than is represented by any particular school or profession, tolerance, sympathy, and understanding are far more likely than where such contacts are denied. If in the high school the future printer, farmer, stenographer, pattern maker, milliner, and prospective collegian associate with one another, bonds of integration among them are built up as they cannot be in the restricted groupings of the trade school and 'commercial school.'

For those of long association together and a large basis of

common experience segregation for purposes of vocational preparation is less a danger than for those who have mingled with the mass more briefly. Thus the graduate professional school set off by itself is less a factor to social disintegration than the trade school for textile operators opened to boys and girls of fourteen. This latter as a type is as undemocratic and socially disintegrating as the 'seminary for young ladies' and the 'exclusive preparatory school.'

So run the arguments pro and con. For the high school as against the trade school one more is added. In the case of widely distributed vocations to which many schools have access the high school has the advantage of the special school, outside the larger cities at any rate, that is a 'stay-at-home school' for the majority of its pupils. Thus it becomes accessible to many who because of youth or for pecuniary reasons cannot go to the special school at a distance. To justify its cost and the *duplication of 'overhead expense'* which is inherent in a dual system of schools a special school must serve larger numbers for a particular vocation than must a high school. For example, a special school of agriculture to draw in the one hundred and fifty boys necessary to its economical operation must serve several counties. Four boys in five board away from home. The high school department of agriculture may draw in its twenty boys from three townships or a single township and not a boy be obliged to board away from home.

The trend of economic organization to increasing specialization and localization makes it likely that there will continue to be need for special segregate schools of the 'day school' type. In general, however, the ends of efficiency and accessibility may be served by the *integrative organization* with decided advantage to democracy. In the case of education of 'the adult employed' segregation to limited contacts is almost inevitable. However, in evening, part-time, and factory schools, it is often possible to make administrative groupings that will ensure contacts among those of somewhat diversified interests. That, of course, is highly desirable, whether teaching

be of the extension school order or under separate administration. On the same ground a trade school ministering to a dozen different vocational interests is preferable to one that ministers to but one or two.

SUMMARY ABSTRACT

1. Vocational schools may be organized as separate and special schools or as schools within schools, such as departments in a high school or colleges within a university.

For the special school it is argued:

- a. That it may be more readily located with reference to teaching resources and the clientele which it is designed to serve.
- b. That it makes for vocational *morale* and like mindedness by keeping those of like experience and interest together.

For the school within a school it is argued:

- a. That a division of labor among such schools according to favorable location for this or that type of vocational education will do away with any alleged advantage of the special school.
- b. That it obviates the necessity for much of the duplication of plant and staff that is entailed by a system of special and separate schools.
- c. That it provides for a range of contacts among pupils of different interests that makes for integration and liberality, as against the disintegrating and narrowing influence of homogeneous interest groupings.

CHAPTER XX

PROBLEMS OF POLICY

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Should the chamber of commerce in a city tax its members for the support of commercial education in that city and designate a committee of its members as a governing board for 'commercial education' in the city? Should the teaching profession be called upon to support and control the normal schools and teachers' colleges? Should the plumbing trade be responsible for all agencies engaged in the education of plumbers?

2. If all the nations of the world borrow publicly and privately in 1926 a thousand billion dollars how much is the world's productive power increased in 1926? Suppose a city in 1926 issues bonds in the amount of \$250,000 00, the bonds to mature in 1976, and builds a new school house during 1926. Is the school paid for out of the resources of 1926 or those of 1976?

PUBLIC VERSUS PRIVATE ESTABLISHMENT

1. Another question of policy is of considerable significance from the standpoint of democracy Mr. Link in his recent book, "Education and Industry," has put in print a view that has many supporters. To wit: Public education should not "go so far as to train employees for the exclusive benefit of certain private enterprises." Responsibility for such work "falls entirely upon the particular industry, partly because the industry derives the most direct benefit, partly because it alone is able to conduct such instruction in a practical fashion. Those who are most directly and exclusively benefited by any particular educational activity shall bear the final responsibility." If the particular form of education benefits "the individual and the community rather than the particular industry," then the responsibility and the burden "should be assumed by public educational institutions or by the individual himself."

Professor Henry C. Morrison in the "School Review" lends support to this position and adduces the further argument that the cost of an extended system of vocational education is so great that public support of it is a practical impossibility. In consequence industry is called upon to support the system if we are to have it.

There are industries which do now profit directly and almost exclusively from vocational education within the specific lines of production with which they are concerned. As monopolies or quasi-monopolies they are not by economic law compelled to share with the consuming public any gain that may come to them from reduced 'overhead,' decreased 'labor turn over,' or more effective manufacture. Fortunately such are few in number. But there are many others, of the highly organized industries, in which there is not among owners, operators, or employees, the slightest disposition or the faintest conception of an obligation to pass on, except as economic law compels them to do so, any share of gains that may come as a result of education. As they see it, all gains that industry can hold belong by right to industry. The ends of democracy are served by an equitable or satisfying division of those gains among the particular industrial membership.

Now these compact, specialized, and highly organized industries are exactly those that under Mr. Link's criterion should be charged with the vocational education of their prospective and existent members. Neither Mr. Link nor Mr. Morrison proposes that the legal profession, the medical profession, or the teaching profession shall assume the cost and the control of the preparation of lawyers, physicians, and teachers. Too obviously such 'industries' are not ends in themselves, but instruments to social service.

Some, however, find it difficult to discover that there is any essential difference between the obligations of the adding machine industry to the rest of the world and those of the legal profession. Or, again, to see that the welfare, efficiency, and happiness of adding machine company employees is less

a concern of the public than the welfare, efficiency, and happiness of physicians. It seems rather that one purpose of vocational education should be to reconstruct such industries as "benefit most directly and exclusively" into more tolerable and useful components of democracy than they now are. Vocational education should change the views and habits of owners, managers, and employees with respect to their vocational obligations in a democracy.

Present industry, charged with the investment of its resources in vocational education, may reasonably be expected so to utilize those resources as to return the largest possible profit to industry. If the preservation of the industrial and economic *status quo* is the first aim of vocational education, then the proposal that industry shall be charged with it is wise.

Mr. Link's suggestion that in many cases, at least, industry "alone is able to conduct instruction in a practical fashion" has merit, but it is a half truth only. Doubtless industry must furnish the medium of instruction. But it does not follow that industry must direct the activities of learners in that medium to its own particular ends. If a peculiar system of blue printing and filing exists in a particular plant it is true that those who would learn the system must be admitted to the plant and directed in carrying through the system. It does not follow, however, that the instructor shall be chosen by the company, paid by the company and responsible to the company. Democracy is concerned with the acquirement of proficiency by workers and with the use that is made of it. The skill of the worker does not belong to him alone, or to the industry of which he is a member, but to the state also. Teachers must be agents of democracy rather than of private individuals or private industries. For the teacher is neither to be exploited nor an exploiter.

In a democratic system of education every individual should profit. But we have long since abandoned the view that therefore he must be charged with the cost of his education to

the extent that he profits by it. Mr. Link's individual, who "rather than the particular industry" or the community, profits by vocational education, is no more a desirable citizen in a democracy than is the industry of "direct and exclusive profit" a desirable institution.

2. There are those whose understanding of economic law is such that they believe it possible to saddle the cost of a new school building, a new highway, or a war upon posterity by the issuance of bonds. It is the same naïve conception that leads to the belief that society can somehow escape the cost of vocational education by turning it over to industry. By allowing industry, instead of government, to expend a part of the social income for the extension of vocational education it is in some mysterious fashion not spent, but saved. The economist, however, does not see it in that way. If it is spent it is spent and society pays the bill. If, however, the public pays through industry it has no control or direction of expenditure. If it pays through taxes to government it may determine the purposes and activities of vocational education with reference to the forwarding of democracy. Assuming the soundness of the proposition that government plus industry can support vocational education it follows that government alone can do so. It appears to the advantage of democracy that it should undertake that support.

For a long time to come we shall have privately supported and controlled vocational education, not all of it selfish or undemocratic in its purposes and methods. Part of it will serve the useful purpose that private education has so often served — that of innovating and experimenting and marking out the paths of progress. Part of it will be expedient merely, to meet the demands of industry as such, and to fill in the gaping deficiencies of a ponderous and slow-moving development of public education. In the full realization of democracy, however, we shall have, as Director Wright has so often said, "all education for all the people" under public support and direction.

SUMMARY ABSTRACT

1. It has been proposed that the extension, support, and control of vocational education should be shifted in considerable measure to private interests.

For this proposition the following general arguments are advanced:

- a. That, since private industry benefits largely or exclusively from the extension of vocational education, industry should maintain such education.
- b. That vocational education is too costly for public support — hence the burden must be borne by industry.

Against the proposition these general arguments may be advanced:

- a. The argument that private industry as chief beneficiary of vocational education should be charged with the maintenance of it is based upon a false conception both of democracy and of vocation.
- b. If the assertion that vocational education is too costly for public support is sound, then it is obviously too costly for industry. If supported at all it must be supported from the social income. If it be charged to private industry private industry will control the disposition and use of that portion of the social income necessary to the support of vocational education, and may reasonably be expected to control it in accord with its private interests. If it be charged to government the direction of expenditure may be controlled to the ends of democracy. In either case the cost of maintenance is a charge upon the social income and not upon private industry or government as such.

CHAPTER XXI

DUALISM IN EDUCATION

PRELIMINARY QUESTIONS AND SUGGESTIONS

1. Can a carpenter be cultured? A farmer? A clergyman? If so, when — while at work on the job or after supper?
2. Can a plumber acquire culture in studying plumbing? Can a Latin teacher acquire it in studying Latin? Can an historian acquire it in studying history?
3. What is culture?

THE CULTURAL AND THE VOCATIONAL IN EDUCATION

1. In the view of our foremost 'educational sociologist' culture and vocation are not antagonistic, but they have "nothing in common." The activities of vocation, in his view, include direct labor in the production of economic utilities and such thinking and planning as directly influence that labor. The vocational in education, then, consists in the learning of the technique and technology of vocation. Such insight and appreciation as may be necessarily involved in the acquirement of productive skill and knowledge is a by-product merely and in no sense cultural. For the standards and activities of culture lie in that part of life and education which are unrelated to the economic. Association with vocation negates any cultural value that experience might otherwise have.

Another view common among educators and the laity goes a step further and assumes that 'the good life' and good education consist in a proper 'balance' between vocational experience and cultural experience. The 'subjects' of school and college are divided into vocational studies and cultural studies. Certain subjects are vocational and narrowly utilitarian, others are cultural and broadly — well, not exactly useless, but, well, cultural and breadth-giving. At any rate each serves as a

balance to the other in the development of a 'well rounded' education. For every minim of the vocational virus there must be injected one, or sometimes two or three minims of the cultural anti-toxin. Thus in the high school a unit of carpentry, animal husbandry, or cookery is compensated by a unit of algebra, or ancient history, or both. Many 'vocational curricula' both in secondary schools and colleges are built upon this principle of balance or compensation.

Certain of those, however, who accept the theory of balance without question, hold that neither vocational nor cultural value is inherent in any subject as such. It is purpose in teaching the subject and not the subject itself that determines the kind of educational value to be derived from it. For example, in a recent discussion among a group of university professors it appeared to be the consensus of opinion that completely duplicate courses in economics offered in the arts college and the law college respectively were utterly discrete in their values. That given in the arts college was cultural and without vocational value; that given in the law school was vocational and without cultural value. The same theory is sometimes manifest in agricultural and engineering colleges. Though Huxley long ago protested that the distinction between 'pure science' and 'applied science' is fallacious and misleading, the distinction is still made; to the 'pure sciences' cultural value is credited, to the 'applied sciences' denied.

The extreme view that the cultural and the vocational in education, if not in life also, are in deadly antagonism, and that compensation or balance between the two is an intolerable compromise between good and evil is familiar in the writings of certain Neo-Ciceronians who have rallied to what they call "*a defense of the classics.*" These good men and women are narrowly explicit in the definition of culture. It is possession of the languages and the traditions of the Golden Age and the Renaissance. As to vocation they are shudderingly vague. It is something modern and materialistic whereby men acquire filthy lucre.

In sympathy with such a view, but more resigned, is that formulated by one of our ablest litterateurs. Crass as it is, vocation is certainly necessary in the life of man; so much so that education must, unfortunately, give some heed to it. But such attention must be severely restricted lest culture perish. Further there may be culture in the lives of relatively untutored men; for culture is not wholly of the classics. Lincoln was a cultured man despite his ignorance and uncouthness. For his life was wholly selfless, and in selflessness is the key to culture.

2. Ruskin, Arnold, and Dewey, the most thoughtful writers upon culture of modern times, appear to agree in one thing. The most certain factor in culture is the attitude and habit of mind that it implies. Culture is a process of valuing life and living it according to the values set upon it. The cultured man values life as a critic in terms of intellectual and emotional standards, and strives so to live that those standards shall prevail. Culture is both selective and dynamic. It is neither a mere possession nor the badge of possession. This view is widely accepted among thoughtful men.

Difficulties, however, arise in determining the scope of 'life' and of the standards by which judgment and conduct shall be governed. Not all of life is within the compass of any man. Not all the breadth can be surveyed nor all the depths of humanity be plumbed by the genius of a Shakspeare in the life-time of a Methuselah. Truth and beauty are clothed in so many and so varied guises that not even a Wells or Shaw can penetrate them all. Moreover, if it be granted that truth and beauty are human, it is granted that they are relative and changing. What is true for one race and era is not true for another. What is beautiful in one group is not beautiful in another. Ruskin has one set of standards, Arnold another, and Dewey a third, each more generous and catholic than the preceding. It is little to be wondered that disagreement and contention abound on lower levels.

The dualists appear to agree in this; that out of the life

which falls within the purview of culture we must throw vocation. There is nothing of culture in the critical evaluation of one's own primary activities and service, but there may be culture in the critical appreciation of the vocation of another. There is cultural value in the study of poetical, musical, or architectural technique if one is or is to be a farmer, but none in the technique or technology of agriculture. To be sure, when they are pressed, the proponents of the dualistic views usually hedge a little. The poet, the musician, and the architect may extend life into vocation and find some culture there; the farmer, the carpenter and the cook may not — except that the latter may do so possibly in France where cookery is under the tutelage of the Immortals. There is culture for the engineer in the study of Cæsar's bridge — particularly if he read the account in the original — but none in the study of the Hudson tunnel. There is culture for the farmer in the study of Jacob's defrauding of Esau, but none in the study of Bakewell or Davenport. If a man's vocation be modern or humble no cultural value exists in the study of it; if it be ancient and honored there may be cultural values in the study of it.

Such a view is undoubtedly helpful in simplifying the relation of the cultural to the vocational in education. But it does not appeal to all minds. The vocation of the sculptor may involve a greater scope of life than that of the humbler stone-cutter, yet to some of us the life involved in the latter seems as truly life as the former. In so far as the stone-cutter finds in stone-cutting emotional and intellectual values he seems to meet the criterion of culture as truly, if not so largely, as the sculptor artist in the critical evaluation of his art. It seems that simplification cannot be satisfyingly effected by reducing the scope of life to leisure and a few approved vocations.

It may be that simplification can be effected by acceptance of a few fundamental standards. Perhaps most vocations must be thrown out of the life of culture because they are not amenable to the standards of the true and the beautiful. The Neo-Ciceronians have a ready answer here. The classic ages

furnish us with standards for all time. The true answers to modern problems are the ancient answers. Has not Arnold said that the standards of culture are to be found in "the best that has been said and known"? Is there a doubt that the Athens of Pericles, the Rome of Vergil, the Florence of Leonardo, the England of Shakspeare, and the Germany of Goethe, have said and known the best?

One may answer yes to the first question and no to the second, but still disagree with the "defenders of real education." Arnold's dictum is acceptable. The past must furnish the standards and the standards must be the best. The difficulty comes in applying the dictum. When does the past cease, and what is its best?

The Greek culture that has never been surpassed was governed by the standards of Pericles, Praxiteles, and Plato rather than by those of Agamemnon and Achilles. Athens found her culture standards chiefly in that fringe of the past that swept the heels of the years of her greatness — that border of the past which for any generation of a people makes up the present. With the Athenian the past was not a dim, closed, and glorified era beyond the memory of living men, but a continuous trail of the present in whose fresher traces gold was yet more abundant than in the older and vaguer imprints far back. Athens interpreted life by the best that was, not by the best that had been long ago. No age has approached the Athenian culture except as it has done likewise. Raphael, Michelangelo, Goethe, Shakspeare, even Milton — arche-type of culture for the classicist — set standards of their own, not Greek and Roman standards of truth and beauty in art and literature. Even so, such standards are best because the best have called them best. Whether Rodin and Whistler, Longfellow and Whitman are even good, is still a matter of acrimonious dispute among those who have the courage or the stupidity to assume that their judgment is final in such matters.

But much of the accepted classic best has to do with vocation, not in the product only, but in the technique of produc-

tion. Poets and dramatists study Shakspeare not for what he said, but for the way he said it. Shakspeare set standards for the critical evaluation of vocational activity no less than did Cæsar, Demosthenes, Sir Christopher Wren, Machiavelli, or any one of a probable majority of the 'great men of all time.' But if the premise be granted that culture and vocation are discrete then the use of such standards in the critical evaluation of one's work as poet, dramatist, soldier, advocate, architect, or diplomat is neither in the act nor in the result cultural. The conclusion is clearly logical, but it makes the premise look absurd.

To some of us it seems that just as the Greeks found it possible to develop standards not of a remote and blindly worshipped past, so it may be possible for us to look to other than classic days, even to the always degenerate present, for certain standards of truth and beauty. No time or group has produced the best in everything. Our materialistic day has developed standards in many fields of activity that no classic period has ever approached. In science, in philanthropy, in medicine, as in the vulgar arts of agriculture, commerce, and industry, we pass on a heritage much enriched by our own contributions. Some of the "best that has been said and known" and *done* is being said and known and done in this our day and generation. The heritage of social environment through reaction to which the individual grows in the process of culture is neither exclusively of a classic past nor exclusively of the life not economic.

The social product of the individual's evaluation of life is his doings. That "manners maketh the man," despite a ridiculously narrow interpretation often placed upon it, is a significant statement of the meaning of culture. In the narrow view it means conformity to convention, and particularly to the conventions of an 'exclusive group.' The 'cultured man' does this thing because it is the 'proper thing,' and foregoes that other because 'it is not done.' Cultural education, then, becomes a process of habituation to conventions in the evalua-

tion of which the individual has no part. Many schools and colleges are considerably affected in curricula and organization by such a conception of cultural education.

Conformity to convention, however, will hardly suffice to distinguish the cultural from the vocational. Vocations are full of conformities to convention. Many professional men are slaves to the conventions of their professions. One who has spent a few weeks in a hospital or has dealt extensively with lawyers may readily confirm the statement. The vocations of household and hotel servants are bristling with conventions; the unionized trades abound in them. Merchants and 'business men' are hedged in by them. Yet most of the conventions of vocations, as those of leisure, are rational and meaningful. They are manifestations of considered values. From the standpoint of culture in the broader sense, however, it would seem that understanding and critical acceptance or rejection of them are far more significant than the habit of conformity. The cultured man may manifest his culture as truly by non-conformities as by conformities. The basis of dualism does not lie in acceptance of group conventions.

Our essayist has suggested another basis of dualism — to be sought in the recondite and elusive field of motive. Culture is selfless; vocation is selfish. Education may by these be divided into the cultural and the vocational categories. Here is her illustration of the selfless in education: "Sir Walter Scott put the case with his usual simplicity and directness in a letter to his second son, Charles, who had little aptitude for study: 'A knowledge of the classical languages has been *fixed upon*, not without good reason, as the *mark* of a well educated young man; and though people may *scramble into distinction* without it, it is always with the greatest difficulty, just like climbing a wall instead of giving your *ticket* at the door.'" And again, "In addition to the things that it is useful to know, there are things that it is *pleasant* to know."

It is selfless, then, to seek education as a ticket of admission to distinction, or to seek it as a means to pleasing one's self. Stigmatizing vocational education as "preëminently selfish," or quite the opposite in motive to the selfless education illustrated, our essayist pays to those who seek education from vocational motives a compliment as unintentional as it is undeserved. But her view is by no means uncommon or without influence on education. "Art for art's sake" and "science for the sake of truth" are almost universally held in higher esteem than art for service and science for the welfare of mankind. To paint for the joy of painting, or to study for the satisfaction of one's intellectual curiosity, is, by some strange perversity, more worthy than to paint because others need beautiful pictures, or to seek out new principles because the economic world has need of such. To move directly to the satisfaction of self is less "selfish" than to move indirectly to such satisfaction by serving others. Only by such a standard of the selfless is vocation to be set apart from culture.

That, even, is a doubtfully usable criterion. What the actual motives of those who follow vocational education and that denominated cultural respectively may be we can only guess. Our own motives in the most familiar of life activities are so varied and so obscure that it is difficult to trace them in ourselves. Reason points to a belief that we are tarred with the same brush in the pursuit of culture and of vocation. No dualism between the cultural in education and the vocational is to be established on the basis of assumed motives.

"Of the segregations of educational values . . . that between culture and utility is probably the most fundamental. While the distinction is often thought to be intrinsic and absolute, it is really historical and social . . . The problem of education in a democratic society is to do away with the dualism." John Dewey — *Democracy and Education*.

SUMMARY ABSTRACT

1. Opinion is widespread and influential that the cultural and vocational functions of education are distinct rather than integral. The dualistic theory is variously expressed:

- a. Cultural and vocational in education are discrete and have "nothing in common," but they are neither inharmonious nor antagonistic.
- b. Cultural and vocational are discrete but necessary parts of a complete or 'well rounded' education, in which one serves to 'balance' the other:
 - (1) The 'balance' may be achieved by compensatory measures, 'vocational subjects' being matched against 'cultural subjects' in a properly 'balanced curriculum.'
 - (2) The 'balance' is to be achieved not in terms of subjects as such, but in terms of the general purpose of the course in which the 'subject' fails.
- c. Cultural and vocational are not merely discrete, but antagonistic — the cultural being good, the vocational evil.
- d. Cultural and vocational are discrete and inharmonious, but both are necessary. The distinction is not one of 'subjects,' nor of social purpose, but of individual motive.

2. Culture is a process of valuing life and living it according to the values set upon it. The cultured man values life as a critic in terms of intellectual and emotional standards, and strives so to live that those standards shall prevail. This view of culture is commonly accepted among the proponents of the foregoing dualistic views. But in such a conception of culture the hypothesis of discreteness between cultural and vocational hangs upon definition of life and of standards for valuing of it:

- a. The dualistic position throws vocation out of the category of life for the individual but admits to life his critical valuing of vocations other than his own, an impossible and arbitrary assumption.
- b. The proposition that the standards of culture must be derived of the best contributions of the past does not carry the corollary of dualism between culture and vocation; rather it implies the reverse:
 - (1) The past is not a period but a continuous development.
 - (2) The 'best' contributions of the past are in large measure vocational contributions.
- c. Conformity to conventional standards does not distinguish culture from vocation. Vocations are full of conventions, and conformities. Nor by the accepted definition of culture among the dualists is conformity a criterion of culture.

d. Appeal to motive as the basis of differentiation is uncertain and difficult. So far as it serves as a standard it points to the continuity rather than the discreteness of cultural and vocational.

3. The distinction between cultural and vocational is neither "intrinsic" nor "absolute"; "it is really historical and social." It has no place in a system of education designed to promote the progress of democracy.

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